

**RESTRAINT OF DOMESTIC,
LABORATORY AND WILD
ANIMALS**

RESTRAINT OF DOMESTIC, LABORATORY AND WILD ANIMALS

***A Manual for Veterinary Students,
Practitioners and Animal Handlers***

by

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PREFACE

What is covered in this manual is the basics of the art and science of the physical and chemical restraint of domestic, wild and laboratory animals. Senior veterinary students, veterinary practitioners, game wardens and laboratory owners will find the manual useful. Also, the manual is useful to other animal handlers such as animal instructors, animal owners, and teachers of biological sciences in secondary and tertiary institutions.

A wide range of physical techniques and chemical dosage rates is provided in the manual in order to cater for the varying field conditions of the handler. A number of illustrations have also been included to enhance clarity. It should, however, be noted that the techniques discussed in this manual are by no means exhaustive.

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1

RESTRAINT OF DOMESTIC AND LABORATORY ANIMALS

General Considerations

Restraint can be defined as holding back, checking or suppressing action, keeping something under control or depriving physical freedom to an animal. Basically, animals can either be physically (manually) or chemically restrained. Various methods are applied depending on the circumstances but all aim at minimising the effect of handling an animal. However, the safety of persons handling an animal is necessary and it is important to remember that an animal's behaviour is unpredictable. Hence, knowledge of a particular animal's behaviour will generally guide one on the approach. Also, one has to be aware of the defence mechanisms of the animal being restrained and take precautions when handling it.

Safety of the patient

During restraint, safety of the animal is important. It is thus advisable to use a technique compatible with the health status of the animal and the intended procedure. It is also important to remember that, an animal removed and brought back into a group may be

fought by the other animals thereby leading to injuries. However, experience will help one to foresee problems associated with restraint and take steps to prevent them.

Physical restraint of animals

Physical restraint is important for the safety of both the personnel and the animal handled. The health status of the animal and the intended procedure determine the restraint technique to be used.

Equipment for physical restraint

Hands are the most flexible instruments of restraint and can be used for manipulation. But in addition to being injured, hands can cause injuries like fractures dislocation or suffocation. Fortunately, commercial instruments designed to cause pain to the animal and distract it from the part of the body being worked on are available for each species.

Voice

Generally, animals respond to the tone of voice used by the handler who should however be careful not to cause fear or show lack of confidence in the voice. Usually, a combination of voice and manual restraint tends to calm the animal since it is made aware of one's presence when approached and handled.

There are three tones of voice used to let an animal know what is expected of it. These are:

Soothing tone – the voice is soft and crooning and is used when the animal is calm.

Instructional voice – the voice is firm and abrupt and is used when the animal balks or refuses to follow instructions. Instructional tone should be firm and decisive but of lower pitch than the soothing one.

Commanding tone – This is used to make the animal behave or pay attention.

Circumstances for restraint

For routine restraint, day light is important but nocturnal animals are best handled under bright light and vice versa for diurnal animals. Environmental temperature may be important too. For example, pigs should be handled in the morning when it is cool as malignant hypothermia may occur if they are handled under hot weather. Important also is setting the site of restraint, which should be such that the animal cannot escape. In addition, all the necessary equipment should be in good working condition.

Duration of restraint

This should be short in order to avoid unpredictable complications. One should also remember to use the minimum restraint necessary to complete the procedure intended; preferably, starting with gentle hands and using a reassuring voice, then progressively applying more restraint as needed.

Tying of knots

It is important to learn how to tie the basic knots and hitches used in large animal restraint since one requires the use of ropes and knots to secure the animals to objects (or to immobilise them.)

Some of the terminology used in physical restraint where ropes are applied includes the following:

Standing part of a rope: This is the longer end of the rope i.e. the part attached to the animal.

End of a rope: This is the shorter part of the rope that can be freely moved about.

Bight: A sharp bend in the rope.

Knot: Making a knot means intertwining of one or two ropes in which the pressure of the standing part of the rope alone prevents the end from slipping.

Hitch: A temporary fastening of a rope to a hook, post or other object with the rope arranged in such a way that the standing part forces the end against the object with sufficient pressure to prevent slipping.

Loop or half hitch: A complete circle formed in the rope. It can open towards you or away from you. Careful attention on how a loop is made ensures that knots or hitches are successful.

A throw: A rope wrapped to another to make part of a knot.

An overhand knot: A base knot for a number of different knots. It is made by making a half hitch and then bringing the end through the resulting loop.

Types of knots

Square knots: A square knot is used to secure the ends of two ropes together or to form a non-slipping noose. It does not untie or tighten when pressure is applied to both ends. In order to tie it, one needs to remember the saying “*right over lets left over right*”. The piece used to make the first throw is the same one used to make the second throw. It is important to note that a proper square knot forms what looks like two intertwined loops and is easily untied when the opposite ends are pushed together.

Surgeon’s knot: A surgeon’s knot starts with two throws of the first half of the knot, which keeps it from slipping. Then a square knot is tied on top and the same end is used thereby enabling the first throw to make the other two throws.

Reefer’s knot (single bow knot): Reefer’s knot is similar to a square knot except that the second throw is made by first forming a bight in one rope and tightening the knot with the bight in place. The correct end should be used to tie the knot. The pulling on the end of bight rope should create a quick release square knot.

Tomfool knot (double bowknot): This is a variation of the square knot used to bind two limbs together (Fig. 1).

Fig. 1: Tomfool knot

Procedure: Find the centre of the rope and make a loop so that it opens towards you and then hold the loop in the left hand. Make a second loop opening away from you and hold it in your right hand. Move the two loops so that the right one is underneath and half way across the left. Wrap your index finger around the side of the left-hand loop. As your index and middle fingers grasp the side of the right hand loop, your left hand pulls the left loop and vice versa. Slide the right side up through the left loop and then the left loop down through the right loop. Two adjustable loops open when you pull or the loops themselves close when you pull on the ends. To secure the knot more fully, place a square knot or reefers knot on top of the resulting knot while holding the loops at the desired size.

Halter tie or quick release knot: This is used to secure an animal to an immovable object. It can be released quickly by pulling the end of the rope in case the animal is entangled in the rope or goes down for any reason. This quick release will prevent injury during struggle.

Procedure: Pass the end of the rope around a post and make a loop in it that will eventually open towards you close to the post. Then lay the loop on the standing part of the rope and make a bight slightly further down the end while holding on the loop with the left hand. Pass the bight behind the standing part of the rope and up through the loop, pulling the bight only through the loop and leaving a protruding end to be used to the loose knot. Finally, pull on the end of the standing part rope to tighten. To untie, pull on the end of the rope of the bight.

Note:

- Always keep the rope from the neck short and high enough so that the animal does not step on the rope or get entangled in it.
- To make sure that the animal does not release itself, pass a through loop and remove it when releasing the knot.

Sheet bend knot: A sheet bend is used to tie two ropes of different sizes securely together.

Procedure: Make a bight in the larger rope and run the end of the smaller rope through the centre of the bight back around behind the two parts of the bight in the larger rope. The larger rope is then brought under the smaller rope. Tighten by pulling on the ends of smaller rope.

Bowline-on-the bite knot: A bowline on the bite is aimed at making non-slip noose that wouldn't tighten. It is safe to place around an animal's neck and is easy to untie.

Procedure: Double the rope in half and make a loop that opens towards you. Then tie an overhand knot leaving a large bight. Reach through the bight with your right hand and reach the bottom of the overhand knot. Using the left hand, grasp the middle of the bight and while moving the right hand back and up, pull the bight to the left until the right hand is all the way through the bight. Release the bight with the left hand but continue to hold onto the loop with the right hand. Then using the two hands, pull the two sides of the loop into opposite directions to tighten the knot. If you slide the knot down to the bight instead of pulling on both sides of the loop, the resulting knot will be a sliding noose, — which is very dangerous as the animal might strangulate.

Half hitch (simplest tie) knot: It is a loop that can be either opened towards you or away from you depending on the requirement. It is good for temporary fastening if steady pressure is going to be applied on the rope.

Procedure: Pass the rope around a post to form a loop; then part of it around and through the resulting loop in the standing part. Finally, pull the ends to tighten around the post (two half hitches are usually used).

Clove hitch (two half hitches) knot: This is a fast and easy way of securing a rope to a vertical post. It can be at the middle of the rope or at the end. Tension can be applied on one end or both ends without slipping.

Procedure: Make a loop opening towards you and another one away from you similar to the initial stages of a tomfools knot. Both loops are placed over a post starting with the first loop then the second directly on top of that the bend/the loop. Each hitch is separated by tagging on each end, one at a time, and then together. The knot should not slip.

Snubbing hitch knot: The snubbing hitch knot is used to hold an animal on to a post by either a halter or nose lead. It allows slack to be taken up or given and can be secured to allow the handler to perform his duties.

Procedure: It is started as a half hitch around a post. It is then secured by wrapping the end around the standing part, two or more times. Lastly, the end is wrapped or a bight is made between the end and the standing part. To slack the rope, lease the bight and pull down the end.

Maintenance of ropes

For general maintenance: Ropes should be inspected for tears, stress points in the strands, drift and kink. Dirty ropes should be washed with warm water but not detergents because detergents weaken the rope.

Generally, ropes should be dried before storage to prevent them from becoming mouldy. They should then be stored properly while

coiled or secured to prevent kinks and twists.

Whipping: This is a procedure that prevents unraveling and fraying of the ends of a rope. It involves making a simple overhand knot on ends and for nylon ropes melting the ends.

A smaller diameter cord is used to tie (whip) the end of the rope. In order to prevent whipping from falling off the end, about 1–10 inches from the end of the rope is spat.

Procedure

- 1) Lay about 4' of smaller cord lengthwise near the tip of the rope (1-2" away) bight close to the end of the rope – 2-4" long strands with a bight near end. Start wrapping the cord around the two strands and the rope away from the end leaving a small tag below the trapped strands. Cover both strands of the cord completely with the end of the wrapping cord brought through the bight. Bring the bight with the end under the wrapped strands of the smaller rope by puffing the tag rope left uncovered next to the standing part of the rope. Clip-tag the top close to the wrap to finish the whipping processes.
- 2) Use of adhesive tape at tip.
- 3) Making of a 4"-6" crown using the end of the rope: It is made by unravelling the end of the rope and intertwining into the standing part of the rope; then rolling the end on rough surface. This allows the blending of the strands and the exposed ribs of the intertwined rope, which is trimmed at the level of the main rope.

Chemical Restraint of Animals

General principles

Use of drugs for animal restraint requires a general understanding of the terms used to describe the effects of these drugs on animals as well as their pharmacology, antagonists, the correct methods of their administration. Also, it requires the ways to respond to any complications or emergencies that might ensue following their use.

General considerations

Chemical restraint may be defined as the use of drugs to bring about sedation or neuroleptosis, neuroleptanalgesia, neuroleptanaesthesia or short duration general anaesthesia. This is a reversible process whose purpose is to produce convenient, safe, effective and inexpensive means of restraint so that clinical procedures may be carried out with minimum of stress, pain, discomfort, and toxic effects to the patient, the anaesthetist or the clinician.

Indications for chemical restraint

Chemical restraint of animals is required to facilitate the following among other things:

- Radiography;
- Cleaning, grooming and dental prophylaxis;
- Sample collection, bandaging, splinting, and cast application;
- Capture of exotic and wild animals;
- Transportation;
- Manipulation of patients including catheterisation, endoscopy, closed reduction of luxations or fractures, wound care and obstetrics;
- Smooth induction and maintenance of general anaesthesia and ensure a quiet and uneventful recovery.

Selection of drugs and techniques for chemical restraint

The general criteria for selection of drugs and techniques for chemical restraint include:

- Species, breed, age, and relative size of the animal;
- Physical status and specific disease process of the patient and any concurrent medication, if any;
- Demeanour of the patient and presence of pain;
- Personal knowledge and experience;
- Available assistants and their training;
- Familiarity with available equipment; and
- Length and type of operation or procedure to be performed.

Drugs for chemical restraint

No ideal drug exists for chemical restraint of animals. However, good ones should have the following qualities: be efficacious; reliable; have a rapid onset of action; be used in small volumes; have freedom from toxicity or side effects at therapeutic doses – specifically, have freedom from local irritancy and cardiovascular or respiratory depressant effects. Finally, they should provide a convenient duration of action for the required purposes.

Terminology

Analgesia: Means loss of sensitivity to pain.

Anaesthesia: Total loss of sensation in a body part or in the whole body, generally induced by a drug that depresses the activity of nervous tissue either locally or generally.

Local anaesthesia: Analgesia limited to a local area. Insensitivity (anaesthesia) to painful stimuli (analgesia), heat, pressure and other peripheral sensations achieved through selective blocking of structures of the peripheral nervous system without affecting functions of the CNS.

Regional anaesthesia: Analgesia limited to a local area, generally an extremity.

General anaesthesia: A state of unconsciousness produced by a process of controlled, progressive and reversible drug-induced intoxication of the central nervous system (CNS) in which the patient neither perceives nor recalls noxious stimuli. *This ideally includes hypnosis, hyporeflexia, analgesia, and muscle relaxation.*

Hypnosis: Artificially-induced sleep or a trance resembling sleep from which a patient can be aroused by stimuli.

Narcosis: Drug-induced stupor or sedation in which the patient is oblivious to pain, with or without hypnosis.

Neuroleptoanalgesia: Hypnosis and analgesia produced by a combination of a neuroleptic (ataractic) drug and an analgesic.

Sedation: Mild degree of CNS depression in which the patient is awake but calm and from which a patient can be aroused with sufficient stimuli. Sedatives produce a dose-dependent depression

of the cerebral cortex. The term sedation is often used interchangeably with tranquilization.

Tranquilization; ataraxia; neuroleptosis: A state of tranquillity and calmness in which the patient is relaxed, awake, and unconcerned with its surroundings and potentially indifferent to minor pain.

With sufficient stimulation, a patient can be aroused from this state. Tranquillizers act by depressing the hypothalamus and the reticular activating system.

Routes used to administer drugs

The routinely used routes are: intramuscular (IM); intravenous (IV); oral (Per Os); subcutaneous (SQ or SC); inhalation; epidural, and intraperitoneal (IP).

Intravenous administration: Drugs for chemical restraint of different animal species can be administered through different blood vessels. The following is a list of the animal species and the blood vessels that can be used:

Canine: the cephalic vein is routinely used. Others that may be used include the lateral saphenous vein, jugular vein and sublingual veins.

Feline: the cephalic vein; medial saphenous vein.

Equine: the jugular vein.

Bovine: the jugular vein; ear veins.

Caprine and Ovine: (goats and sheep or other small ruminants): the cephalic vein; radial vein; jugular vein.

Porcine: the ear veins are most commonly used. Others include femoral vein, jugular vein; anterior vena cava.

Note: all injections must be made under strict asepsis.

Instruments and equipment: The following are necessary for facilitating administration of drugs for chemical restraint:

- Hypodermic needles and syringes;
- Catheters - over the needle and through the needle catheters;
- Flutter valves - for administration of large volumes of fluids under gravity;
- Fluid administration or infusion sets;

- Face or cone masks for use with gaseous or inhalation agents;
- Induction chambers or bell jars for use with inhalation agents.

General considerations prior to administration of drugs

Prior to administration of drugs for chemical restraint, it is important to evaluate the patient/animal. The following, where necessary, should be established and evaluated:

- Species, breed, age, sex, and body weight of the animal.
- Client's complaint and history of the patient. This should include duration and severity of illness; concurrent symptoms of disease, level of activity, recent feeding, and any previous or concurrent administration of drugs and any previous reactions to sedatives, tranquillizers and anaesthetics
- Current physical examination of the patient to evaluate general body condition. Examine the cardiovascular, pulmonary, hepatic, renal, gastrointestinal, nervous, metabolic, endocrine, intergumentary and musculoskeletal systems.
- Laboratory evaluation where necessary should include plasma protein, packed cell volume (PCV), haemoglobin, complete cell count, blood gases, haemostasis, albumin, blood chemistry profile and urinalysis.

Note: Some laboratory animal species may require specific evaluations before the administration of the drugs. However, these will be highlighted under the specific animal species/groups.

2

RESTRAINT OF DOMESTICATED RUMINANTS

Restraint of Cattle

Restraint of cattle depends on breed, age, sex and knowledge of animal behaviour. For example, bulls are unpredictable and should be handled with care. Aggressive bulls for instance, will paw the ground with front feet, lower and shake the head. They may also make mowing sounds. Nervous cows will keep head and tail up and may have an anxious expression in their eyes.

Herding Cattle

If cattle are handled as a herd, they can easily be moved from one place to another without problems. They should be kept calm as they are walked because if excited, they run wildly. Therefore, urge cattle with voice and use a whip judiciously or prod on the rump and back of the legs. In addition, they should be moved into a barn or pen slowly by allowing them to inspect the place first before driving them in.

Should you want to isolate an animal, put it in a small group to enable you handle it singly.

Restraint in a stanchion: An animal can be restrained by use of stanchion (Fig. 2).

Fig. 2: *A cow restrained in a stanchion*

Restraint in chutes: An animal is walked on the alleyway to the chute and when it reaches the neck-squeeze area, close the handles to catch the neck. Usually, there is a rear gate chain or a transverse bar which is closed or put in place once the animal is in place to prevent other animals from entering and also to prevent the animal from backing out. Some chutes have an allowance for squeezing the animal to one side for easy manipulation. To release the animal, the operation is reversed and it starts with release of body squeeze, then the neck squeeze. After this, the animal walks out through the front gate. One should always remember to leave the rear gate closed until the front gate is closed and another animals are let in.

Restraint using a crush: A crush can be used to restrain many animals at a go. It can be constructed of posts or planks or steel tubing. However, the internal surface should be free of sharp edges or projections that can injure the animal. So, it should comprise of an assembly area with a funnel ending in a closed pen with the final run being just wide enough for one animal and sufficiently high enough to prevent it from jumping. Backward movement is

prevented by a transverse bar inserted just behind the animal.

Restraint using chest twitch (Fig. 3): Chest twitch is used for exceptionally restless cattle. A rope is tied around the chest and held under tension by a strong pole twisted in a rope loop. However, chest twitch should be used only when there is no other method of restraint.

Fig. 3: *Chest twitch*

Restraint of the head: Most head restraints are best used when the animal is in a chute. Always approach the animal from the side to avoid any head butting.

Rope Halter (Fig. 4): This is the best tool for restraining the head of a cow.

Procedure: Stand on the left side and place the noseband around the muzzle with the portion that tightens under the chin and loose end coming out on the left side. Head stall around the ears, fitting it properly while avoiding the eyes. The animal's head should be easily handled after this.

Fig. 4: *Rope halter in a cow*

Nose lead (Figs. 5 and 6): It restrains cattle by applying pressure to the nasal septum. It is shaped like a pair of tongs with a large ball at the end of each arm, which fits against the nasal septum. Usually, it has a chain or rope at the end.

Procedure: Hold the lead out for the animal to sniff. As the animal raises its head to sniff, slip the nose lid into the nostrils and close quickly. Then tie the rope to the post for continuous restraint but remember it loses effect when the nasal septum becomes numb. You may however manually hold the nasal septum with your index finger and thumb *nose grip* and slip in the nose lead. It is advisable to avoid using nose lead too frequently on the animal as it may become “head shy”.

Fig. 5: *Nose lead*

Fig. 6: *A cow with a nose lead in place*

Nose ring is a metal ring applied permanently across the nasal septum. When pulled, it causes pain and the animal is calmed. It is used to handle bulls and especially to lead them from one place to

the other. This is done by attaching a bull staff (a long rod with a hook at the end) to the nose ring and together with the halter, it helps move the animal.

It is advisable to use two ropes on the nose ring and have one held on either side and to have an additional person at the halter.

Head grip: grip the horn or the base of the ear in hornless cattle while holding the head up.

Nose grip: Grip the nasal septum with the thumb and index finger and hold the base of the ear or the horn.

Restraint using the tail; Tail twitch (Fig. 7): Rough handling easily breaks the tail. The best method is to “jack” the tail, which will distract cattle from painful procedures. In order to do the jacking, place the animal in a chute or stanchion with the base of tail seized by both hands so that it is turned upwards and forwards. Procedures such as rectal and vaginal examination, coccygeal venipuncture and udder examination are best done with the tail twitch.

Fig. 7: *Tail twitch*

Tail tying: To prevent cows from swinging their tail into your face, and even spraying dirt on the surgical site with the switch or obstructing your view when working on the hindquarters, you can tie the tail using the method described for the *horse tail tie*.

Restraint of the legs: In addition to head butting, cattle may also kick in a forward motion that arcs backwards. In order to avoid cattle kick, the safest place to stand is next to the shoulders (but remember a cow can kick past their shoulder with hind limbs). Restraint of the feet of cattle may sometimes require sedation or general anaesthesia.

Raising of the fore leg: This can be done by hand in the same way as in the horse. The fore leg can also be raised using a rope attached to the fetlock or metacarpus, passed over the withers and held on the other side of the animal by an assistant (Fig. 8) or tied to an over head beam.

Fig. 8: *Raising the front leg of a cow*

Frank fold grip (Figs. 9 and 10): Hold the fold of the skin between the stifle and the flank. The grip tenses the *fascia lata* so that the limb cannot be flexed.

Fig. 9: *Flank fold grip (cow)*

Fig. 10: *Flank fold grip (Calf)*

Leg twitch (Fig. 11): A short loop of rope is placed around the hock and tightened by twisting a pole 30–40 cm long. This immobilizes the Achilles tendon and consequently, the stifle and the hock joints.

Fig. 11: *Leg twitch*

Hobbles (Fig. 12): They are used to prevent kicking. Milking or chain hobbles are made of two metal bands that fit round the leg just proximal to the hock. Application is from the right side facing towards the rear. Squat down and apply the left and then the right hobble.

Fig. 12: *A cow with hobbles in place*

Figure-of-eight rope fetter (Fig. 13): Standing on the right, start by putting the rope around the left leg above the hock; then twist the rope and pass it around the right leg. The rope is applied in a figure of eight above the hocks.

The free end of the rope is kept under tension from the rear. It immobilizes both legs.

Fig. 13: *Figure-of-eight rope fetter*

Raising a hind leg of a cow: This can be done by using a rope.

Procedure: A rope is tied with a noose around the metatarsus and passed over a beam and back to the hock as shown in (Fig. 14). Then an assistant tightens the rope until the leg is at the desired height.

Fig. 14: *Tying the hind leg of a cow for raising*

Fig. 15: *Raised hind leg of a cow*

Restraint of calves

Be careful when working with calves in front of the dam as it may butt you with its head in defence of its calf.

Walking a calf: One arm is wrapped around the calf chest — in

front of fore limbs — the other hand holds the tail or the hindquarters. Walk the calf where it is required. Larger calves may however be led on a halter or be driven with other animals as a herd.

Flanking or placing a calf in a lateral recumbency: Place the calf's body so that its left side is parallel to yours. Then position your right knee into the calf's flank and reach around the calf's body to grasp the opposite flank with the right hand. With the left hand, grasp the loose skin just behind the shoulder; then push the calf with your knee and lift it with both hands. Slide the calf down your leg on to lateral recumbency. When recumbent, the calf should be restrained on the ground by putting your knee on the neck as in (Fig. 16). If necessary, you can tie the front and hind limbs together with a rope.

Fig. 16: *A calf in lateral recumbency restrained on the ground by pinning the neck with a knee*

Restraint of Sheep

Sheep have an intense instinct to remain with the flock and as such, it is best to handle them as a flock initially before isolating the animal you want to perform certain procedures on. When disturbed,

they will stamp their front feet and will use the head to attack. Hence, always work gently, calmly and with assurance around them.

Sheep have very fragile bones that can easily be broken and heavily woolled sheep may become hyperthermized if chased around. Moreover, handling sheep by the wool will damage the wool or the subcutaneous tissues thereby reducing wool and carcass quality respectively.

Capturing a sheep: Drive the flock into a small pen or enclosure and then approach an individual animal slowly. Swing your arm around the neck and front quarters and quickly wrap your other hand around the hindquarters or grasp the tail if present.

Shepherds crook: Hook a rear leg at the hock, quickly immobilize sheep as above.

Halters: Can be used but remember sheep have a short nose and should be careful not to block the nostrils.

Restraint for examination

Setting a sheep on its rump (Fig. 17): Stand on the left side with sheep's body parallel to yours, the left knee placed against the shoulders. Then grasp the right flank with the right hand and hold the jaws with the left hand and move the head to the right. Step back with the right leg and lift the flank. The sheep will lose balance. Quickly turn it and sit it on its rump. Then stand at the back of the sheep with your legs bracing the sheep's back and tie the sheep so that it is tilted about 60° angle to keep it from struggling. But watch out for the fore limbs as sheep flail them about and could injure your face.

Fig. 17: *Sheep set on its rump*

Restraint for oral medication

Oral medication is administered either as bolus or solution. The technique is to drive sheep into a squeeze pen or a small box stall to obtain restricted movement and then to pick one sheep at a time.

Procedure: Grasp the jaws and elevate the head so that it is nearly perpendicular to the ground and open jaws. Then give the drug and lower the head for the animal to swallow. Alternatively, set the sheep on its rump for medication.

Restraint for jugular venipuncture

One can use sheep stocks to reduce lateral movements or manually restrain the sheep by putting it at a corner so that “m” is at the corner and the side against a wall. “Strangle” the sheep and grasp the jaws; then elevate the head (or push the sheep against the wall and elevate the head). Blood can also be taken when sheep is on its rump.

Restraint of new born lambs

Place your hand between the front limbs and sternum and let it rest on your arm. Large lambs are however handled like adults.

Restraint of lambs for tail docking and castration

Procedure: Drive lambs to a small pen and capture one at a time. Start by grasping the front and rear legs on the same side with each hand i.e. right legs with right hand and vice versa for the left legs. Flip the animal on its back and rest its back either against your legs or on your laps if you are sitting down. Hold the hind legs with both hands to expose the tail or scrotum.

Restraint of Goats

Goats do not tolerate rough treatment and will struggle violently if not properly handled. Therefore, restraint time should be as short as it is necessarily possible.

Procedure: Identify the lead goat (usually a nanny) and lead her into a barn or pen. The rest of the flock will follow. Although goats are usually docile and easy to handle, you must be friendly as you approach them for some can be aggressive. An aggressive goat holds its tail up close to the back with the hair raised along the spine. It will sneeze, snort or stamp on the ground and may rear up and butt with the head.

Restraint for examination

Stand still for a while, then grasp one front limb and lift it. Most goats will stand still and so one is able to do most of the manipulations. The rear leg can also be used but it is not as good as a forelimb as the goat will kick and struggle. If it is the only way, start with the rear leg and then move to the front limb.

Walls and fences: Push the goat against the fence or wall with your legs and hip and leave your hands free for other procedures. You can also push the hindquarters against a wall and then put your hand around the neck to keep it still for temperature taking or injection.

Restraint on lateral recumbency: The goat is placed parallel to your legs; the jaws are grasped with one hand while the inside rear leg is grasped with the other hand. Bring the leg forwards. The goat will be thrown off balance and fall on the ground.

Alternatively, position the goat parallel to your legs; reach over its back and down beneath its abdomen and grasp the rear legs. Lift the legs and gently flop the goat down onto the ground. Hold all four limbs firmly and press your knee on the neck to keep the animal recumbent.

Restraint of the Head: This is best when the goat is pushed in a corner and the body held against a wall.

Procedure: Grasp the beard (if bearded) with one hand and encircle the neck with the other arm to stabilize the head.

Use of horns: This should only be for a short time as goats react violently when horns are held. Moreover, horns should not be used in very old goats as they break easily.

Cheek hold: Place one hand on either side of the cheeks and wrap fingers around the mandibles to hold firmly. You can examine the eyes or take blood from the jugular.

Collars: Leather collar or neck chain can be used in dairy goats to lead or restrain them. They may be temporary or permanent (collars). Neck chains should be made of small, flat links, which don't catch easily as the goat rubs against a fence.

Restraint for dehorning and castration

Dehorning: Capture the kid; then sit down and fold its leg down in your lap with the fore arms placed on its back to keep it from regaining its feet. Grasp the head by positioning your hands on each side of the neck with fingers wrapped around the mandible (sternal recumbency). The thumb should be behind the ears. You can use the fingers to apply pressure after dehorning to control haemorrhage.

Castration

Restraint is the same as for the lamb.

Restraint for hoof trimming: This is required when there is overgrowth of the hoof. An assistant holds the beard (if bearded) neck or cheeks of the goat to restrain it from moving.

Trimming of the front limbs: Stand slightly in front of the leg and grasp the leg at the ankle; lift and bend at the knee. Hold the leg with one hand and trim with the other hand using shearing scissors. Alternatively, place the foot on your knee and trim with both hands.

Rear limbs: Stand behind the rear of the animal and grasp the leg at the ankle, lifting gently and stretching it behind the goat; then rest the stretched leg on your knee or on some object and trim.

Restraint for venipuncture: Cephalic vein is commonly used for venipuncture. It is similar in anatomy and technique to that of the dog. Hence, the goat is backed into a corner and pushed laterally on the wall.

Procedure: One hand is put around the neck and the other hand grasps the forelimb. Then the thumb finger is wrapped around the top of the leg after which the venipuncturist holds the lower leg and stabilizes the vein for venipuncture. The *cheek hold* can also be used for head restraint.

Chemical Restraint of Domesticated Ruminants

General considerations

Ruminants usually accept physical restraint well. So, in conjunction with local or regional anaesthesia, many surgical and manipulative procedures can be carried out. They have a multi-compartmental stomach with a large rumen that does not empty completely. Therefore, use of sedatives and tranquilizers for their restraint can easily lead to the animal becoming recumbent and this can lead to complications.

Complications associated with recumbency include tympany (bloat), regurgitation and aspiration pneumonia. To prevent these complications, fasting of cattle, sheep, goats, and camelids for

twelve to eighteen hours and water deprivation for eight to twelve hours might be advisable before use of chemical restraint. Fasting of neonates is inadvisable as this may lead to hypoglycaemia.

Drugs available for chemical restraint

Acepromazine (Acp)

This is the most commonly used phenothiazine derivative in ruminants.

Dosage

Cattle: 0.05 mg/kg bwt, IV or 0.05–0.2 mg/kg bwt, IM.

Sheep/Goats: 0.03–0.05 mg/kg bwt, IV or 0.05–0.1 mg/kg bwt, IM.

Side effects

Regurgitation, hypotension. It is contraindicated in debilitated and hypovolaemic animals.

Alpha2-adrenoceptor agonists

Drugs in this group include xylazine, detomidine, medetomidine, and romifidine. They provide excellent sedation of ruminants at lower doses but higher doses can lead to recumbency and light planes of general anaesthesia. Xylazine is the most used and studied alpha2-adrenoceptor agonist in ruminants.

The response to xylazine in particular is variable between species, within species and between individuals. For example, goats are more sensitive to xylazine than sheep and cattle while Herefords are more sensitive to xylazine than Friesians.

Alpha2-adrenoceptor agonists provide very good analgesia and muscle relaxation in ruminants but induce hyperglycaemia and hypoinsulinaemia in cattle, goats and sheep.

Stressful environments cause pronounced or prolonged response to xylazine in cattle.

Xylazine

Dosages

Lower doses for all: 0.015–0.025 mg/kg bwt, IV or IM. Provides sedation without recumbency.

Higher doses

Goats, 0.05–0.2 mg/kg bwt, IV or 0.1 mg/kg bwt, IM

Sheep, 0.1–0.2 mg/kg bwt, IV or 0.2–0.3 mg/kg bwt, IM.

Cattle, 0.1 mg/kg bwt, IV or 0.2 mg/kg bwt, IM.

These dosages will lead to recumbency and provide light planes of general anaesthesia for up to 1 hour.

llamas, 0.3–0.4 mg/kg bwt, IV will provide 20 to 30 minutes of recumbency.

Detomidine

Lower dosages

Cattle, 2.5–10 µg/kg bwt, IV.

Sheep, 10–20 µg/kg bwt, IV.

These dosages will provide standing sedation for 30 to 60 minutes.

Higher dosages

Sheep, 30 µg/kg bwt, IV.

This dosage produces recumbency in sheep.

Side effects of alpha2-adrenoceptor agonists:

Hypoxaemia, hypercarbia, increased urine production, pulmonary oedema (sheep), and may cause abortion in the last trimester of pregnancy in cattle (especially xylazine).

Pentobarbitone

Dosage

Cattle, 2.0 mg/kg bwt, IV.

This provides standing sedation and tranquilization. It provides moderate sedation for 30 minutes and mild sedation for 60 minutes.

Side effects: Can cause excitement.

Chloral hydrate

Provides good sedation and basal narcosis in cattle. It should slowly be administered intravenously. It causes severe tissue irritation if it is administered perivascularly.

Dosage

Cattle, 4-7 G/100kg bwt of a 7.5% solution.

This provides sedation for 30 to 40 minutes. Large doses will lead to recumbency.

Diazepam (Valium)

Dosage

Sheep and goats, 0.25–0.5 mg/kg bwt, IV. This gives 30 minutes of sedation without analgesia.

Note: Intravenous injections should be given slowly.

Butorphanol

Is an opioid agonist-antagonist, which provides sedation and analgesia in camelids and domestic ruminants.

Dosage

Camelids, 0.1–0.2 mg/kg bwt, IM.

Sheep and goats, 0.05–0.5 mg/kg bwt, IM.

In sheep, ataxia ensues at a dosage of 0.4 mg/kg bwt, IV and excitement can occur if it is given intravenously at a dosage of 0.1–0.2 mg/kg bwt.

Xylazine and Butorphanol

They are given to achieve neuroleptanalgesia

Dosage

Xylazine, 0.01–0.02 mg/kg bwt, IV

Butorphanol, 0.01–0.02 mg/kg bwt, IV.

Should be given in separate syringes.

In Camelids, each of the drugs should be given at 0.2-mg/kg bwt, IV. The duration of neuroleptanalgesia in both domestic ruminants and Camelids is approximately one hour.

3

RESTRAINT OF SWINE

General Considerations

Pigs are generally intelligent, stubborn, vocal and sometimes vicious animals. Consequently, they are difficult to handle. Therefore, they should be handled gently and talked to. The approach should be slow and deliberate. This is because they have some physical disadvantage for handling, such as poor eyesight that makes them easily frightened. Their insulating layer of fat makes them susceptible to hyperthermia and their legs have small bones, which can break easily if not handled properly.

Their main defence is teeth. They also have very strong shoulder and neck muscles and by using the snout, they can lift heavy panels of fence. Their body is streamlined and as such, can squeeze through small openings. Due to this streamlined body, pigs cannot be handled easily with bare hands. When handling them, one should work quickly, quietly and efficiently with minimum restraint so as to minimize injury and complications.

Moving and capturing pigs

It is very difficult to capture one pig out of a herd because when the pig squeals, others come to its' aid very fast and they may attack you. They are usually moved to a small pen using barriers or hurdles. These are made of plywood, plastic or metal large enough to cover one's legs. They may also have handles or holes made in them for easy carrying. The same hurdle may also be used to isolate a single pig.

Pigs can be directed with a flat stick or cane. You can turn a pig in the desired direction by gently tapping it on the shoulder or side of the face. The tap should not be too hard to cause pain or damage to the skin.

Rope harness: Pigs can be manoeuvred with a rope harness which is made by making a loop that can be passed over their heads and tightened in front of the shoulders.

Procedure: Make a half hitch in the standing part of the rope. To restrain the pig, hold the loop down in front of it so that it can walk through the loop. When the front legs have passed through the loop, pull the rope tightly; then apply different pressures to the rope to manoeuvre the pig where it is wanted.

Lifting young pigs: For pigs up to 25 kg, vaccinations, castrations and administration of drugs may be carried out while lifting them. The technique is to capture the pig by hind limbs proximal to the hock joint, then lifting and placing the head between one's legs, (Fig. 18).

Fig. 18: *A Lifted young pig*

Front limbs may touch the ground to support some of the weight of the animal and calm it down. The pig could also be held with the forelimbs when you want to work on the fore parts. Let the shoulders and the back rest against your legs for support.

New-born pigs may be lifted using the rear legs. They can also be lifted by placing one hand on the chest between forelegs and the other hand over the shoulders.

Remember: a sow with a litter is potentially aggressive and squealing piglets should be caught away from the mother.

Head restraint: Most of the restraint procedures in adult pigs involve the head; and because pigs are naturally stubborn, they will want to move in a direction that is opposite to the one you steer them. But by pulling the rope harness in the opposite direction, they will move where required.

Using a bucket: Place a bucket over the head and the pig will back away from the bucket. By holding the rail, as the animal backs away, you can take it where required.

Snubbing rope (rope snare) (Fig. 19): This is used to hold a pig in one spot or tie it to some object. A loop is made in a short length of a rope.

Procedure: Stand close to the pig and dangle the loop in front of the animals' face. The pig will start mouthing the rope. The rope is then quickly pulled into the mouth as close to the commissars of lips as possible and the loop, which must be behind the tusks tightened across the top of the snout.

In boars, one may have some difficulties getting the rope behind the tusks. Hence, one may have to force the rope through the mouth by the sawing action.

Fig. 19: *Rope snare in a pig*

You may also use two ropes and cross tie them to restrain a pig.

Note: The rope should not be placed in position and the pig left unattended or be on for more than 15–20 minutes as it may create a tourniquet effect on the snout.

Hog snare (Fig. 20): These are used for large pigs but the principle is the same for the rope snare. Made of a metal pipe with a cable loop on one end, the free end of the cable runs through the hollow pipe so that the size of the loop can be controlled.

Procedure: The loop is dangled in front of the pig and introduced into its mouth behind the tusks and then tightened.

Note: Excess pressure on the snout should be avoided.

Fig. 20: *Hog snare in place*

Casting pigs: Pigs are restrained on the head after which one can use either hobbles or a trough to cast them.

Hobbles: These are especially made for pigs and are designed for placing on hind limbs after which a rope is attached to the hobble and the legs pulled out from under the pig while twisting gently in order to throw the pig off balance.

Procedure: Use the standing rope after snubbing the snout to make a half hitch around a rear leg. Pull the rope and bring the leg and snout together. This will knock the animal off balance. Attach a rope to a front and rear leg on one side of the pig. Both ropes are passed under the abdomen and up the opposite side of the pig and then over the back towards you. Pull on the rope, and the legs will be lifted from under the pig, toppling it over to its side. Use the ropes to tie the legs together.

Trough: The trough is usually “v” shaped and is used to keep smaller pigs on their backs.

Procedure: The pig is placed in the trough on its back and then the rope is tied around one rear limb and passed from under the trough to tie the opposite leg to the same forelimbs. This technique keeps the pig in the trough.

Chemical Restraint of Swine

General considerations

The anatomic structure of pigs is not conducive to the manual restraint especially when they have grown to a large size. By then, no part of their body is easily grasped for restraint. Besides, pigs have only a few superficial veins (primarily on the dorsolateral surface of their ears) into which an injection can be made.

Intramuscular injections must therefore be made with needles in excess of 3 cm in length. Shorter needles may result in injection into fatty tissue thereby delaying drug absorption into the bloodstream and delivery into the central nervous system.

To be also noted is that pigs are often unable to withstand stress imposed by manual restraint. So, avoid rough handling especially during hot weather as this can lead to overheating and acute death.

Available drugs

Butyrophenones (Azaperone)

This is the most effective tranquilizer for chemical restraint of swine.

Dosage: 1.0–2.0 mg/kg bwt, IV or 2.0–8.0-mg/kg bwt, IM.

Phenothiazine derivatives

Two Phenothiazine derivatives are commonly used for chemical restraint of swine. They are:

Acepromazine

Dosage: 0.2–0.6 mg/kg bwt, IV (the dosages for IM use is double the IV one).

Promazine

Dosage: 1.0–3.0 mg/kg bwt, IV (the dosages for IM use is double the IV one).

Benzodiazepines

These are used as minor tranquilizers and their use is limited because of their cost. They induce hypnosis, sedation and muscle relaxation but little or no analgesia. Their effects can be reversed by

flumazenil, a specific benzodiazepine antagonist, which should be administered at a ratio of one part flumazenil to 13 parts of the benzodiazepine. However, the routinely used ones are midazolam and diazepam.

Midazolam

Dosage: 0.1–0.5 mg/kg bwt, IM or IV.

Diazepam (Valium)

Dosage: 1.0–10 mg/kg bwt, IM or 0.5–2.0-mg/kg bwt, IV.

(*Note:* Diazepam is very painful when injected IM).

Alpha2-adrenoceptor agonists

Xylazine

This is the alpha2-adrenoceptor agonist commonly used in swine. But it is not as effective in this species as in others. It causes pigs to lie down in 10 to 15 minutes but when approached, they will rapidly rise and flee. The best sedative, analgesic and immobilization results are achieved when it is given in combination with local anaesthetics epidurally.

Dosage: Xylazine at 0.5–1.0 mg/kg bwt with 10 ml of 2% lidocaine.

This combination can produce complete immobilization of the rear quarters for 3 to 4 hours.

Barbiturates

Pentobarbitone sodium

It produces mild sedation when used in low doses.

Dosage: 2.2-6.6 mg/kg bwt of a 3% solution, IV.

It must not be injected perivascularly.

Ketamine

This is a good immobilizing agent for swine although it causes excessive salivation. Prior to its administration (30 minutes), atropine sulphate (0.04 mg/kg bwt, IM) should be administered.

Dosage: 4-6-mg/kg bwt, IV or 10–12-mg/kg bwt, IM.

Opioids

Several opioids can be used for chemical restraint of swine.

- *morphine*, 0.4-0.8 mg/kg bwt, IV.
- *meperidine*, 0.4-1.0 mg/kg bwt, IV.
- *pentazocine*, 0.2-0.4 mg/kg bwt, IV.
- *butorphanol*, 0.2-0.4 mg/kg bwt, IV.

Etomidate and Metomidate.

These are sedative hypnotic drugs for chemical restraint of pigs when given in low doses.

Dosages

Etomidate, 2–4 mg/kg bwt, IM.

Metomidate, 2–4 mg/kg bwt, IM.

Drug combinations

- *Xylazine* (4 mg/kg bwt), ketamine (4 mg/kg bwt) and oxymorphone (0.15 mg/kg bwt), IM. For IV administration, give half the dosage of each.
- *Telazol* (this is a combination of tiletamine and zolazepam in a fixed ratio of 1:1). The dosage is 6.6-mg/kg bwt, IM.
- *Fentanyl-droperidol* (0.4 mg fentanyl and 20 mg droperidol/ml), at a rate of 1 ml./25 kg bwt, IV.

4

RESTRAINT OF HORSES

General Considerations

The size, speed, strength and personality of horses make them potentially dangerous to restrain. They are also usually suspicious and are quick to detect nervousness in handlers.

However, most horses are not vicious and usually submit to properly applied restraint procedures even though cooperative horses can cause fatal injury if suddenly frightened or hurt. Fortunately, horses give warning signals that should be heeded in order to prevent possible injury. For example, ears are the most expressive parts of the horse – their movements provide an indication of the horses' feelings.

When the horse is alert, the ears are flicked forwards and the horse is usually curious of one's approach. A nervous horse will continuously flick the ears back and forth especially when there is activity behind it while an angry or fearful horse will pull its ears backwards. This should however not be confused with laid-back ears where a horse is concentrating on a difficult task such as calf roping or barrel racing.

The tail always indicates the horse's attitude. A wringing or circling

tail is an indication of nervousness. A tail held straight down indicates pain or sleeping, while a tail clamped tight indicates fear. Nevertheless, each horse is an individual and should be treated accordingly.

Horses can be calmed by an even tone of voice and are most cooperative when handled quietly and decisively. They can also, be easily “bribed” with a handful of delicious foods like oats, carrots etc. Scratching behind ears, eye ridges and the neck will convince the horse you are friendly.

Manual Restraint

Approaching a horse

A horse should be approached from the front and slightly to the left (near) side because they are accustomed to being handled on that side. They become nervous when handled from the right side.

Watch carefully as you approach the horse and if it starts to walk away, talk to it and offer some “bribe” while stopping it if possible. Then move slowly, without making any sudden movements so that you do not startle it when close; touch the animal and scratch it behind the ears and the base of the neck before applying a halter.

Applying a halter: You start applying a halter by slipping the lead rope over the horse’s neck, then catching the end as it comes into your reach. Then tying a single over-hand knot to keep the rope from slipping off. Most horses will believe they are caught and stand still. Remember to be alert as something may frighten the horse and take off. If this happens, hold on to the rope and talk to the horse to calm it down. But if a horse panics and resists restraint, let it go in order to prevent injury.

Sight of a rope may be resented by some horses and because of these, hide the rope as you approach them. More nervous horses may be enclosed in a small pen in order to catch them. But leaving horses in pen with oak is better than chasing them as the chase gets them excited.

Catching a horse: While approaching a horse, keep your movements slow and deliberate. Then hold the rope at waist height and make a loop that just brushes the ground. Make sure that the major portion of the rope is coiled and held loosely in the left hand so that it can peel off after the horse is caught.

Procedure: The loop should be held with the right hand on the left side of your body with the palm towards you. Stay eight to ten feet from the fence on your right side. Then drive the horse between you and the fence; the horse all the time being kept along the fence to prevent it from dodging the rope.

Toss the loop of rope up so that the horse runs into it. The rope is snubbed around a post when the horse is caught. (*It is to be remembered that horses may resist a rope and as such it is wise to wear gloves to prevent rope burns as you pull.*) When the horse is caught and has settled down, you can now apply a halter.

Some horses are “head shy” and throw their heads up or sometimes even rear up if a person reaches towards the face. This may be due to previous rough treatment around the head and neck. Horses should be approached from the back of the head so that they do not see the halter approaching. Gestures should be kept lower than the muzzle. One should also remember to move slowly and deliberately while talking to the horse.

It should be noted that when approaching a tied horse or a horse in a box stall from the rear; you should always let the horse know that you are approaching by talking to it as you get closer. Remember also that, the horse’s kicks range between six and eight inches straight back and that, horses are usually very accurate. Therefore, if you pass behind the horse, be about 10’–12’ away to be safe. Or you can stay in direct physical contact by keeping a hand on the rump when passing at the rear so that if the horse kicks, the blow is less severe and is likely to cause damage further down where it is not life threatening. To be safe, never get into a very small box stall or small enclosures with a horse. Horses don’t react well to overly constraining conditions and may panic and trample or kick you as they try to get away.

The main tools of equine restraint are halter and lead rope and should always be used when working or leading a horse and should always be checked for splits or fraying because a weak rope jerks the horse's head.

Restraining a foal: In most cases, a foal will try to hide behind its mother's flank.

Procedure: Start restraint by backing the mare to the corner of a large box stall. As the foal moves, grasp it around from the chest with one arm and quickly around the rump or grasp the tail with the other hand.

Once you have restricted the forward movement, the foal will attempt to back up, thus enabling you to grasp the head and the tail for restraint. Afterwards, press the foal against a wall or a sturdy partition or use another person on the other side.

Remember not to hold the tail too tightly or press the tail down between the legs, as this will make the foal sit down. Also, you should not lift a foal from the ground as it may act violently when made to stand. As you handle the foal, talk to it to make it comfortable. Never remove a foal from the sight of the dam as both will fret until untied.

Tying a horse: When a horse is left unattended, it should always be tied to a sturdy object with a properly fitting halter and suitable lead rope using a quick release knot such as a halter tie. Allow 2–3ft of lead rope so that the horse can adjust the neck angle and then shift position as desired.

If the lead rope is longer than 2-3ft, the horse may tangle its feet in it and if it is less, it may frustrate the horse and cause it to try to escape. But don't tie too high or too low in an unnatural angle — tie it in a way that the head is held in a natural position. Make sure that there are no natural hazards around the horse in order to avoid injury if the horse is frightened.

Leading a horse

Always walk on the near (left) side of the horse, close to the shoulder and hold lead rope with your right hand about 1.5-2' away

from the base of the halter. With the left hand, hold the loose end of rope in neat loop. The entire rope should be held in front of you. Never wrap the hand or have the rope running behind you because if the horse bolts, you will be pulled along and this can lead to serious injuries or death.

After leading a horse, stand as close to its shoulder as possible and face the same direction as the horse (Fig. 21).

Fig. 21: *Standing a horse*

Neither should you stand far from the horse as it can rear up and kick you with its front limbs; nor should you be too near as it can step on your heel as you walk. Also, never move under the neck of a horse to get to the other side as some horses may try to bite. But if a horse tries to bite you, punish it immediately by giving it a firm rap on the muzzle. You may not have to cause pain but will convey the message that you won't tolerate such behaviour.

Restraint of the head: This is required for most procedures in the horse and the standard equipment used is a halter and a lead rope.

Two important rules to follow

- Always stand on the same side of the horse as the person who is working on the animal because most escaping horses will run away from you and if there is obstruction on both sides, it will pass over the smaller barrier. This can lead to injury to the person working on the animal.
- Never stand directly in front of a horse because if it rears up, it can injure you. Also, always stand to the side of the horse and be prepared for a sudden reaction. Sometimes, a halter may not provide adequate restraint and you may need to use other devices to distract the horses' attention such as a twitch or a chain chunk.

Twitches: Common twitches include: chain; rope; and human (clamp) twitches. All these have advantages and disadvantages.

It is to be noted that:

- A twitch works for a short time before the muzzle loses feelings and so the greatest effects occur initially. In order to maximise the usefulness of a twitch, tighten and loosen the loop to allow for blood circulation. This keeps the horse sensitive to the twitch.
- Horses will resist a twitch when it is first applied. If the horse continues to struggle, try another method of distraction.
- After a twitch is removed, massage the muzzle to restore blood circulation. This makes the horse know that a person can touch its nose without hurting it.
- A twitch may be used on the lower lip but curl the lip inwards in order to prevent injury of mucosa.

Chain twitches (Fig. 22): These are flat chains attached to the end of a stout wooden handle to form a loop.

Application: Hold the twitch with the loop over the left hand while catching one side of the loop between your little finger and ring finger to prevent it from slipping down onto your wrist. Grasp as much of the horse's upper lip with the left hand as is possible while pressing the edges inwards to protect the mucosa. Quickly slide up the handle so that the chain loop rests high up around the lip. Tighten the chain around the upper lip by twisting the handle before

letting the muzzle out. To keep the twitch effective, periodically loosen and tighten the chain on the muzzle.

Fig. 22: *Chain twitch in place*

It is to be noted that a chain twitch will slip off easily when the chain is loosened. Therefore, the length of the handle should be such that one can stand back beside the horse and hold the halter as well. Also that some horses learn to wiggle their upper lip and dislodge the twitch.

Rope twitch: This is a small diameter cord attached to a stout handle to form a loop. It is applied in the same way as the chain twitch and is relatively inexpensive and easy to make. It will stay on the muzzle better than the chain twitch. However, the rope twitch is not the best because it pinches the lip more than the chain twitch and it causes more pain than is necessary.

The hand twitch (Fig. 23): All you need to do is grasp the upper lip with your hand to provide a manual twitch but you should be careful not to twist the muzzle as it will cause more pain than is necessary. Just squeeze or jiggle the muzzle in order to get the desired effect.

Fig. 23: *Hand twitch*

Neck skin grip (Fig. 24): To restrain the horse, grasp the loose skin of the neck.

Fig. 24: *Neck skin grip*

Chain shank: A chain shank is a long leather strap with about two feet of flat chain at its end attached to a snap. It can be used as another distracting device or on horses that need more restraint than just the halter.

How to use a chain shank correctly

With a halter in place, pass the chain end through the ring on the cheek piece and attach it across the bridge of the nose to the ring on the other side of the head. The chain shank is then used to keep the horse's attention focused on its nose. This keeps the horse under control when leading it and prevents it from rearing or trying to bolt. Another method is to run the chain through the halter ring in one side and through the mouth like the balt of a bridle and chipping it to the ring on the other side of the halter.

Two other ways a chain shank is used but not highly recommended are: (a) The chain shank is attached in the same place as above but this time it runs under the jaw. However, this is not good because the tissues are very sensitive and may cause the horse to throw the head up. (b) The chain shank is passed in the same manner as above but instead of running it over bridge of nose, it is run between the upper lip and upper gum. It is effective in distracting the horse's attention but may cause injury to the tissues.

Restraint for dental procedures

Procedure: The left hand is placed on the bridge of the nose with the thumb under the noseband of the halter. The right hand is then placed on the nape of the neck to control the head so that the horse does not suddenly lift the head or throw its nose up. In order to move the tongue out of the way during a dental procedure, simply hold onto the halter by one of the side straps and gently reach into the mouth at the commissar of the lips with the other hand. The inter-dental space between the incisors and the check teeth allows easy introduction of the hand into the mouth without the risk of being bitten. After introducing the hand into the mouth, grasp the tongue and pull it out of the mouth.

Other restraint devices

Cross tying: Cross tying is used to prevent a horse from rearing or from moving its fore quarters from side to side. This is because the horse can still strike with its forelimbs or move its rear quarters. It involves placing a second lead rope onto the centre ring of the halter and tying one lead to each side of stanchion or stocks. The rope is tied high enough to prevent the horse from rearing and entangling its feet on the ropes, which should be the height of the withers or higher and should be tied for a short time. If tied for a long time, it should be provided with food and water high up.

Stocks: These are enclosures with remote or semi open sides and a gate at both ends. They can be made of steel pipes or wooden planks with top bars or planks not higher than the horse's shoulders. The front of the stock should have the necessary hooks for cross tying to prevent the horse from jumping forward or to the side.

Gates are put at both ends because horses do not like narrow confined areas. So, by opening the front gate, the horse can be walked in from the back gate as confining the horse involves opening both gates. When leading the horse through the back gate, step outside the stocks; pass the rope around bars as needed as the horse moves into stocks. Gently close the gates when the horse is inside and remember that the horse should not be left unattended in stocks.

Hobbles: These are used to prevent kicking. For example, during breeding to prevent obstinate mares from kicking the stallion while it is trying to mount; and when one is doing rectal or vaginal examination especially when stocks are not available.

Hobbles involve making a bowline on a bight by placing a loop around the neck of the horse and passing both ends between the front legs and then one rope around each rear leg above the hock. Then the rope is carried over the standing part end, and then back around the leg below the hock from medial to the lateral side. Finally, the end is passed under the rope as it crosses the medial side of the leg.

Both ends of the rope can be drawn up and tied at the hock or can be taken forward and tied to the halter.

Blind folds: Blind folds are used for horses that are afraid of entering a trailer, stocks or box stall or in obstinate horses. Blindfolding calms the horse down. However, this will depend on how blind folds are used. Generally, this involves working slowly and talking constantly to reassure the blind folded horse.

Cradle: It is a device placed around the horse's neck to prevent chewing or licking of a wound. When applied, the horse is not able to bend the neck or turn the head. An animal with a cradle should be fed above the ground level.

Tail tie: Sometimes, the tail is a nuisance and needs to be tied out of the way for certain procedures. The tail is always tied to the animal's body to prevent injury if the horse suddenly bolts.

Procedure: To tie the tail, start by finding the last coccygeal vertebra of the tail. Then support the tail in your hand and lay a piece of rope on top of the tail just beyond (caudal) the last vertebra. The rope is positioned so that the longer end is on the right side of the tail. Fold the tail hairs up and over the rope and pass the short end of the rope behind the tail thereby making a bight as you bring it over to the front. Next, pull the bight through the rope that is looped around the tail. Finally, the standing part of the rope is tied to the neck using a bowline knot.

It is to be noted that most of the horse's weight can be moved or raised by its tail as it is very strong. Sometimes, it is conveniently used to lift the horse under anaesthesia.

Picking up the feet of a horse

Front limb picking (Fig. 25) Procedure: Stand parallel to the horse facing towards the back end and place one hand over the shoulder and gently but firmly, run your other hand down the fetlock.

Grasp the fetlock by placing your palm on its underside and wrapping your index fingers around the joint, squeeze and lift the foot at the same time while leaning on the horse to make it shift its weight to the other limbs.

After lifting the limb, bring it slightly out to the side. Then position your body as close to the horse's body as possible so that your knees are slightly bent. Finally, place the foot between your legs so as to rest on your knee. This position frees the hands.

Fig. 25: *Lifted front limb of a horse*

If the horse jerks its foot, it will usually pull it straight forward and so be ready to stand up when this happens.

Hind limbs picking (Fig. 26): This is approached in the same manner as the forelimb. Once the limb is lifted, extend the leg out to the rear and place it on top of a bent knee closer to the horse. This frees the hands. As the horse moves its foot, it will usually pull back and down off your legs.

Fig. 26: *Lifted rear hind limb of a horse*

Casting: This refers to placing an animal in a lateral recumbency. While ropes were used in old methods, today new methods commonly use sedatives and anaesthetics.

Other Manual Restraint Techniques

Eye press technique: Gently place a finger on the upper eyelid and press down but beware that it is usually difficult if the horse is head shy. Next, work your way to the eye by slowly moving your hand up the side of the face.

Petting technique: “Cavemen pets” or somewhat heavy swat sometimes provide all the distraction needed for minor procedures. It is also useful to talk to the animal in a fine but soothing voice while manipulating it.

Foot elevation: This is used when the horse doesn’t want to stand still when a radiograph is being taken or a bandage is being applied or removed. To make the horse stand still, start by positioning the horse where you want it and then pick up or tie the opposite foot from the one you want.

Grasping the ear: This technique should be used only with the owner's permission. The base of the ear is grasped with the heel of your hand touching the head and squeezing the ear to divert the horse's attention. But avoid excess pressure, which may damage the cartilage causing the ear to flop over.

Chemical Restraint of the Horse

Some form of sedation is required to facilitate equine clinical work; for example, to perform minor surgery or carry out diagnostic procedures. However, the duration of sedation required in such circumstances will depend on the procedure to be carried out. While some procedures require that the horse remain in a standing position, others require the horse be in a recumbent position.

General considerations for chemical restraint of the standing horse

- The horse should remain standing and motionless although slight ataxia is acceptable. A conscious horse struggles violently if it goes down. Use of stocks or standing the horse close to a wall for support is helpful.
- The horse should be indifferent to its surroundings and should not be aroused by noise, handling or movement.
- General analgesia is not essential since local analgesia can be provided. Many drug combinations provide analgesia. Additional analgesia may therefore not be required.
- Sedatives have more satisfactory effects when given in a quiet environment.
- The full effects of drugs following intravenous injections develop after five minutes while twenty to thirty minutes should be allowed for the intramuscular route. Since all drugs used for chemical restraint are central nervous system depressants, a patent airway must be maintained and respiratory and cardiac function monitored.
- The drug(s) should be administered where the procedure is to be carried out to avoid any movement of the animal after drug administration.

- The horse should not be moved until the major effects of the sedation have abated.

NB: It is important to note that all drug dosages are expressed on the basis of body weight (bwt).

Available drugs

Available drugs for chemical restraint of the horse fall into three categories, namely:

Tranquilizers (ataractics) – they produce sedation without drowsiness; a stoical indifference to the environment;

Sedatives – produce central nervous system (CNS) depression sufficient to calm the animal or tranquilization with drowsiness;

Opiate analgesics – produce mild sedation with their analgesic effect calming a horse that is in pain. Their main use in chemical restraint is in combination with sedatives and tranquillisers.

Note: The line between tranquillisers and sedatives is ill defined and a tranquilliser may be used to produce sedation simply by increasing the dose.

Acepromazine (ACP)

This drug is widely used in the horse. It produces only mild tranquillisation on its own. It can also produce unpredictable effects. For example, a horse may occasionally become violent after its administration. The drug is useful on its own in good-tempered horses for management and non-painful procedures such as loading, shoeing and clipping.

Dosage: It is best used at dosages of 0.02 to 0.04 mg/kg bwt, IV and 0.04-0.08 mg/kg bwt, IM.

Onset of action is within 10 to 20 minutes and the duration of action is 2 to 3 hours.

Side effects: lowering of blood pressure and penile prolapse (the penis should be protected from trauma).

Promazine

It produces sedation in equines at a dosage rate of 0.2-1.0-mg/kg bwt, IV.

Xylazine; Detomidine.

These are good sedatives, analgesics and muscle relaxants, which produce drowsiness at relatively low doses. They are good for animals of all temperaments but require a quiet environment for their full effects to develop and provide good analgesia sufficient for minor surgical manipulations.

Dosage

Xylazine: 0.5 to 1.0 µg/kg IV bwt and 1.0 to 2.0 µg/kg IM

Onset of action is 2 to 3 minutes after intravenous and 10 to 15 minutes after intramuscular injection.

Detomidine: 10 to 20 µg/kg bwt, IV and 20 to 40 mg/kg bwt, IM. They have a relatively short-lived effects - 30 minutes for xylazine after intravenous injection. Detomidine's effects last for 60 minutes after intramuscular injection and 90 to 120 minutes. The duration of action for both is longer after intramuscular injection.

Side effects: ataxia, transient hypertension, and bradycardia, respiratory depression, first- and second-degree heart block may occur.

Chloral hydrate

Produces dose-dependent CNS depression and its effects range from mild sedation to general anaesthesia. It is useful for oral administration (in drinking water or as chloral hydrate crystals in dry food) to wild and unhandled horses where injection is impossible and for procedures like radiography.

Dosage: 60-mg/kg bwt, IV for light sedation.

100 mg/kg bwt, IV for deep sedation with ataxia.

60 mg/kg bwt, per os (oral).

Side effects: cardiovascular and respiratory depression may ensue at higher doses.

Note:

- Chloral hydrate should not be injected perivascularly as it causes severe tissue irritation.
- Solutions of more than 10% should not be used.
- Since it must be administered in large volumes, it should be given as an infusion.

Diazepam (Valium)

Has not been used widely in the horse since it has little sedative effects.

Dosage: 0.02 to 0.08 mg/kg bwt, IV.

Side effects: ataxia at higher doses.

Midazolam

It is used at a dosage of 0.02 to 0.04 mg/kg bwt, IV.

Opiates (Opioids) in combination with other drugs

General considerations

Opiates used for chemical restraint in horses include pethidine, morphine, oxymorphone, fentanyl, methadone, buprenorphine, pentazocine, butorphanol, and etorphine.

The important points to note with regard to the use of opiates:

- Opiates are controlled drugs.
- They are used primarily for their analgesic properties as they produce little sedation when used on their own.
- They produce excellent results in combination with sedatives and tranquilizers.
- *Side effects* of opiates include respiratory depression, reduced gut motility, excitement and fall in blood pressure. These side effects are not a problem when they are used at dosages for chemical restraint because they can be reversed by opiate antagonists such as nalorphine and naloxone.
- Potential benefits of drug combinations include better analgesia (due to synergism), reduced dose of each agent and therefore reduced drug toxic effects, while the potential hazards include drug toxicity, excessive CNS depression with concurrent effect on the cardiovascular and respiratory systems and unexpected drug interactions.
- The drug(s) used in combination with the opiates should be given first and allowed to take effect before the opiate is given unless the drugs can be given in the same syringe where recommended.

Drug combinations and dosages for intravenous administration are as follows:

- *Acepromazine* (0.02–0.05 mg/kg bwt) and *xylazine* (0.5–0.6 mg/kg bwt).
- *Acepromazine* (0.04 mg/kg) and *pethidine* (0.6 mg/kg bwt)- can be given together in the same syringe; duration of action is up to 1 hour.
- *Acepromazine* (0.04–0.06 mg/kg bwt) and *pethidine* (0.3-0.4 mg/kg bwt).
- *Acepromazine* (0.05–0.06-mg/kg bwt) and *methadone* (0.1 mg/kg bwt)- can be given together in the same syringe.
- *Xylazine* (0.5–1.0-mg/kg bwt) and *methadone* (0.1 mg/kg bwt)- can be given together in the same syringe and provides sedation for 20 to 30 minutes.
- *Xylazine* (1.0 mg/kg bwt) and *morphine* (0.2–0.6 mg/kg bwt)- the combination produces the most profound sedation for up to 30 minutes and very good analgesia for minor surgery. Excitement may ensue so repeat the xylazine dose. Bradycardia and hypotension may occur.
- *Xylazine* (1.0 mg/kg bwt) and *pentazocine* (0.3–0.6-mg/kg bwt)- provides sedation for up to 30 minutes.
- *Acepromazine* (0.05 mg/kg bwt) and *pentazocine* (1.0 mg/kg bwt)- can be given together in the same syringe.
- *Acepromazine* (0.05 mg/kg bwt) and *buprenorphine* (0.01 mg/kg bwt)- can be given together in the same syringe. The onset of sedation is slow and sedation last for 30 to 40 minutes.
- *Xylazine* (0.5–1.0-mg/kg bwt) and *buprenorphine* (0.01 mg/kg bwt)- can be given together in the same syringe. The combination provides excellent sedation for 30 to 40 minutes, good analgesia and there is no emergence excitement.
- *Acepromazine* (0.04–0.06-mg/kg bwt), *pethidine* (0.3–0.4 mg/kg bwt) and *xylazine* (0.2 mg/kg bwt)- can be given together in the same syringe as a slow injection. Sedation lasts for 20 to 30 minutes.

- *Xylazine* (0.6 mg/kg bwt) and *butorphanol* (0.02–0.04 mg/kg bwt)- when given separately it produces very good sedation.

Note:

- Combinations with Acepromazine produce relatively mild sedation enough for such procedures as radiography and scoping. Local analgesia will therefore be required for painful procedures.
- Drug combinations using xylazine are very effective for violent horses as this results in a more compliant animal that is unconcerned with the environment in addition to providing better analgesia.
- Only the morphine combination can be assured to affect the most difficult animal.

5

RESTRAINT OF CATS AND DOGS

Manual Restraint of Cats

General considerations

Cats have always relied on speed, agility, caution, needle sharp teeth and dagger-like claws for survival. Therefore, they should be approached in a feeble manner. For example, start by extending friendly hand to the cat to sniff while all along talking in a friendly manner to it and at the same time fun stroking the back all the way to the tail as you gently pick it or manage it into the position of restraint.

Precautions

- Close all doors, windows and cabinets before handling a cat because a cat can pass through very narrow openings.
- Also, remove all bottles and equipment from the table to avoid breakage.
- Each cat has a unique personality and as such restraint techniques are variable.
- Be cool when handling a cat as loss of temper may lead to injury.

- Then apply only minimum restraint to allow you do a job.

Restraint techniques

Leg restraint: Always place an index finger or middle finger between two legs. This provides a better grip to prevent escape.

Head – Mandible hold: The palm of the hand is placed under the cat's chin and the fingers are used to grasp mandible.

Scruff of the neck: Hold as much of the loose skin on the back of the cat's neck as possible. This prevents the cat from turning its head to bite. (Fig.27).

Fig. 27: *Scruff of the neck hold in a cat*

Fetal hold (Fig. 28): This is indicated when a cat is beginning to struggle or when you want to move it.

Procedure: Lift the cat off the rubble by the scruff of the neck with one hand. Then place the other hand on the back and push the animal away from you.

The cat will go limb, draw its feet up and tuck its tail up. In this position, the cat can easily be put in a cage or be calmed to allow further handling

Note: Obese or very large cats are not good candidates for this method because their weight may damage the skin or muscles at the back of the neck. You may support their rear end with the other hand.

Fig. 28: *Fetal hold in a cat*

Distraction techniques

Allow a cat's attention to be diverted to other things when doing unpleasant procedures. For example, talking in a soothing tone, scratching the ears or under the chin or gently stroking the body may keep the cat's mind off an examination or injection when used with moderate restraint. But if a cat's temperament changes, adjust restraint accordingly.

You could also hold the head with one hand while the other hand is used to hold the base of the ear (or place a small rubber band at the base of both ears). This will make the cat to sit still and allow administration of drugs orally or into the eye. After removing the rubber band, massage the ear base and talk soothingly to the cat.

Handling cats in kennels

Friendly cats: Allow the cat to come forward so that you can introduce yourself. Then reach out with your hand and around the body and grasp its front limbs, sliding the cat's body to yours and using the elbow to hold it close to you.

Control head with *mandible hold* by using the other hand; carefully holding it properly in order to prevent injury.

Unfriendly cats: When a cat is fractious and does not accept friendly gestures;

Use of a towel or blanket: Throw a towel or blanket over the entire cat; then quickly scoop up the cat inside the towel and manoeuvre to get a better grip.

Use a rope or nylon leash: Make a firm large loop at the end of the leash; toss it over the cat's hand and quickly close the loop down. Next, pull the cat to the front of cage and then pick it up.

Use a captive pole: This is a metal tube through which a plastic coated rope passes to form an adjustable noose. It works on the same principle as the lease but the plastic coating stiffens the rope. It allows one to work some distance from the cat. However, it must be used with caution in order to prevent injury to the cat.

Net: Fish net or any other net can be thrown over the cat's body after which the cat is restrained with hands.

Use of leather gauntlets (Fig 29)

Gauntlets are leather gloves with a long leather steer extending to the elbow. They are used in very aggressive cats in order to protect someone from scratches but not bites.

One has to be careful not to injure the cat when using these gloves and should change to another method of restraint when the cat is on the table.

Fig. 29: *A cat restrained using leather gloves*

Restraint for venipuncture

Blood vessels used for venipuncture include jugular vein, cephalic vein and medial saphenous (femoral) vein.

Jugular vein is used to obtain large volumes of blood or infuse large volumes of fluids rapidly. It is used by placing the cat on a rabble, grasping front legs with one hand and the cat's head with the other hand while placing the index finger and thumb on either side of the mandible. Then with the other arm holding the head, the cat is kept on its sternum while pressing its body against one's side with the legs extended over the edge of examination rabble and nose raised up. Back legs may be wrapped in a towel to prevent scratching.

Cat standing: With one hand, grasp the scruff of the neck and pick the animal off the rabble. Then grasp all the feet with the other hand (back leg first then front legs) and while holding front legs with index finger turn the cat on its back. Next, locate the jugular by holding the chin down while the scruff is being held.

Cephalic vein is used to obtain small volumes of blood or inject small volumes of drug intravenously. The technique is to grasp the

proximal part of the forelimb and then place the thumb on the dorsal surface just distal to the elbow and support elbow with palm or hand. After this, push the limb forwards and occlude the vessel with the thumb. The vessel will become visible in the middle of the dorsal surface of the leg. You need to support the cat's head with the other hand by reaching out the chin and grasping the mandible. The arm holding the leg should go around the cat's body and hold it snugly against your body.

Femoral vein is used in fractious cats. It is located medially between sartorius and gracilis muscle medial to the femur. The method is to place the cat in feline restrain bag, and then to flex the uppermost leg to its natural position in the bag after which the other leg is pulled out. The vein is then occluded by holding the uppermost part of the leg as in forelimb injects.

Note: The vein is very thin walled and easily results in haematomas.

Restraint for general examination

Cats need to be allowed limited freedom only during routine examination. This is done by placing one hand under the neck in front of the chest and the other on top of the back near the base of the tail or around the hindquarter. Then while making some soothing talk, restrict movement. Next, place one hand over the shoulders and the other over the cat's hip and gently but firmly, push to the rabble. This is referred to as scrunch technique and is used when a cat tries to get away or scratch someone. It is also used for routine skin inspection and for subcutaneous injections.

Restraint for administering oral, ophthalmic and optic medications

This is more restrictive. The technique is to place the cat in a sitting position with the back into the crook of your left elbow so that the cat's back is against your arm. Then grasping the head with the right hand, place your index finger and thumb on the cat's body close to your body and grasp front legs with left hand with the forefingers between the legs.

Sitting position with back into the crook of your right elbow: Reach out the cat's body with your right hand and grasp the cat's front

legs with both hands starting with the right leg. The cat will tolerate this manipulation so long as it is not prolonged.

Restraint for injections: This technique is common for IM and S/Q injections.

Cat in lateral recumbency: Stand the cat with its body parallel to yours and then reach over its top with the left hand and grasp the front legs; then grasp the back legs with the right hand and quickly and gently lift the cat and put it on its side on the table. With the left forearm across the cat's neck, gently stretch the front limbs in one direction and the hind limbs in the other.

Note: Agile cats can wiggle out of this hold.

“New York hold”: With the cat standing, grasp the scruff of the neck with your right hand while the left hand grasps the back legs.

Gently lift the cat off the table and lay it on the lateral side stretching hind legs with the body stretched along the right forearm. By now, only the scruff held at the front forelimbs are free but have limited movement. This is a better method than the first one.

A technique similar to “New York” but requiring two people: This technique is used for painful drugs like Ketamine. The cat is placed in front of the handler so that the body is parallel to the handler's with the head towards the left side of the handler. The right hand grasps the front limbs, while the left hand holds the mandible (mandible grip) or holds the head to secure it.

The second handler grasps the hind limbs with the left hand, and the cat is laid on the table. Then the legs are stretched and the head secured with the first handler's wrist.

Restraint techniques requiring one person

Note: Never leave a cat unattended in these procedures because it may fall and injure itself.

Restraint with towel: Cover the head with a towel or cover the entire cat; then lift it up, isolate the needed part and uncover it. This is good for injection or examination.

Towel wrap: Cover the entire body and leave the head protruding. The towel is spread on the table with the cat on the one-third of the

towel next to you and with its body parallel to the towel. Hand on middle part of the cat's back using the far end of towel, and wrap it slightly around the cat. The disadvantage of the towel wrap is that a fraction of the cat is difficult to wrap around.

Restraint bag: Feline restraint bag (cat bag) is normally used to restrict the movement of the cat and also to protect the handler from scratches. The technique is to place an open bag on the table and to place the cat on top of the opened bag; then pushing the cat down as in scrunches, and zipping up the bag with the head out. One may remove a leg through a smaller bottom zip. However, it may be difficult to get the cat into the bag when it is not docile.

Restraint with the adhesive tape: Apply adhesive tape around the legs starting with the hind legs then followed by the fore legs. To release the cat; start by removing the fore limbs first then the hind limbs. One can also use scissors to remove the tape.

"Pretzel" hold: Place the cat on a table with the head away from you, and then grasp the scuff with the left hand with the thumb to the right side of the cat's body. Pick up the right hind limb and move it forward to inject the right leg. Left-handed people should start with the right hand. The hold should be very brief (in seconds), and so one has to be ready to inject rapidly.

Muzzles: They can be commercially available (leather muzzles) or home made using gauze.

Gauze muzzle: Requires a gauze bandage 2-3" long x 1" wide.

Procedure: Make an over hand knot in the middle of the gauze to form a loop. Next, lower the loop over the cat's muzzle and tighten it on both ends of the gauze. Bring the gauze under the jaws, which are tied together under the mandible using an overhand knot with both ends brought behind the ears. Then overhand knot one end of gauze between the cat's eyes and thread it under the loop on top of the muzzle; back between the eyes and tie a bow for quick release.

To remove the muzzle, untie the bow and remove the loop that passes between the eyes; then work the muzzle off in a sawing motion with the two long ends.

Restraint of cats with infectious diseases

Diseases like feline leukaemia, virus infection, calicivirus infection or infectious peritonitis are contagious and should be handled carefully. So, use a laboratory coat other than the one used routinely to handle these cats. They should be handled last so that the examination room and table can be washed thoroughly at least half an hour before using it for another cat. Wash your hands with germicidal soap.

Restraint of Dogs

General considerations

When approaching an unknown dog, approach it by extending your palm with fingers slightly bent. Let the dog sniff the hand and then watch its reaction. A friendly dog gets relaxed, actively sniffs the hand, wags its tail, and soon loses interest in the hand. To win it, gently scratch below the ears advancing to the chest, neck, shoulders and hop of hips. The dog will allow restraining.

Disciplining of dogs

Start by looking at the dog in the eyes and firmly commanding it to rest e.g. “Stop, that’s enough” while using a low voice and drawing out “f” and “r” sounds.

For physical reprimand, you need to grasp the skin on both sides of the neck just behind the dog’s jaws. Elevate the head, look into the eyes, give a quick shake and repeat the word “enough”. Maintain this hold for only a few seconds or gently “chuck” the dog under the chin with open hand.

A reprimand should be given immediately after the dog has committed an offence for it to respond. This is best done in the absence of the owner for dogs calm down easier this way.

Cardinal rule

- Never have clients restrain their own dog when the dog has behaved well during restraint.
- Liberally praise the dog in clipped constructive totalities, and use phrases like “Good dog”, “Well done” while excited.

Refrain from using a high pitched squeaky voice so that the dog may associate with alternate sounds. Most dogs respond to being petted and spoken to while any type of procedure is being carried out. A low soft voice, gentle strokes, slow deliberate movements and a genuine concern for the dog will not only relieve the dog's fears but also impress the dog's owner.

Potential for injury

Consideration has to be given to the dog's size, shape, condition and personality. Puppies, pregnant bitches and old animals, as well as nervous, aggressive and injured dogs should be handled carefully.

Nervous dogs: Nervousness in dogs is detected by shivering, an anxious expression, rapid head and ear movements and ducking of the head. The animal may cower in a corner. It may be calmed by moving slowly, kneeling down to their level and soft talking them out of their fears.

Offer your hand for sniffing. If the dog growls or pulls its lips back in a grimace, retreat and handle it as an aggressive dog.

Aggressive dogs: Some dogs may not accept your friendliness and warn you with growls or some other body language. But signs of aggressiveness are not difficult to perceive. They include a head held low, either below or level with the shoulders, gaze averted off to the side, raised hair along the back, ears down and tail straight out and an ominous growl or snarl. Handle such dogs with extreme caution and they must always be considered dangerous. Two or more people should be involved in handling an aggressive dog in order to help each other in case of attack.

If attacked by a dog, do the following: Hold still, curl into a fetal position, and raise your arm to protect your face and throat, and scream for help. Injured dogs must always be treated with extreme caution and care and as a rule, an injured dog should be muzzled when being handled or moved except when the injury is in the head.

Restraint devices

The following devices prevent injury when used correctly and judiciously:

Muzzles: Commercial muzzles are made of leather, wire or fabric. There are also gauze or nylon rope muzzles. However, one can also muzzle with bare hands.

Leather muzzles (Fig. 30): These must be fitted carefully to leave no room for biting and should be used for as short time as possible.

Fig. 30: A dog with a leather muzzle and chain leash

Gauze or Rope Muzzles (Fig. 31): For dogs with long noses, you do not need to pass the passive end between the eyes to secure the loop over the nose before tying the bow gauze after passing behind the ears. You require a gauze bandage 3'–5' long and 2''–3'' wide depending on the size of the dog.

The dog is leashed or held on scruff or sides of the neck so that the head is steady. A muzzle is tied as for the cat with a bow to allow quick removal in brachycephalosis. A rope or cord may be used instead of the gauze.

Fig. 31: *A dog with a gauze muzzle*

Caution: Muzzles are not fool proof. They can slip or be pawed off or can stretch allowing the dog to nip or pinch bite. Always check the position of the muzzle.

Manual muzzles

- *One hand manual muzzle:* Place the thumb over the nose and wrap your palm and fingers down around the muzzle and mandible or conflux middle finger and place it in between the bones of the mandible; apply gentle pressure and increase it as needed. The finger placed between the bones of the mandible prevents the dog from pulling free.
- *Two handed manual muzzle:* Put your hands on either side of the head with your palms below ears, thumbs over frontal bone of skull and loop your finger under the mandible. Don't occlude the noses. This technique is good for shorter nosed dogs.
- *Leather gloves* (Fig. 32): Those with gauntlets should wear them when handling vicious or aggressive dogs for they reduce chances of serious puncture wounds.

Fig. 32: *A dog restrained with leather gloves*

Note: Leather gloves reduce one's sense of touch and should be used with caution to prevent injury.

- **Rope or metal leashes:** These are made of nylon rope with a slide noose on one end and a loop to handle on the other end or metal chain. They are used for moving a dog from a kennel, leading it to another location or tying it.

Note: Never tie a dog or any other animal with a rope leash to an immovable object and leave it unattended because this can lead to strangulation.

Capture poles (Fig. 33): These are long, thin, rigid and lightweight hollow poles with a rope or wire running through them. A good pole should be long and rigid enough to support up to 100lbs.

Procedure: One end of the loose wire or rope is fastened to a pole and the other runs through the hollow pole. Then the noose is tightened or loosened using the free end of the wire (rope) protruding from the hollow pole.

Fig. 33: *Capture pole (Dog snare)*

A capture pole is used for vicious dogs especially to restrain them for injection of sedatives. Dogs on a leash or capture pole should not be pulled or allowed to fall on the floor as they may fracture or damage the head structure. More than one capture pole can be used in a strong dog.

Tongs: Are used to grasp a vicious dog around the neck. They can be adjusted to prevent the dog from suffocating or when the handler is close to the dog and is likely to be bitten. In a struggling dog, injury is very likely to the handler and the dog.

Blanket and towels: These are used to remove unfriendly dogs from cages.

Procedure: Grasp the scruff of the neck through the towel to lift the dog to an examination on a table.

Handling caged dogs

The main concern here is to prevent injury of dogs coming out of an elevated cage. Start by greeting the animal by calling its name; but don't reach out for the dog when it is sleeping because it will bite.

Small dogs (less than 15 kg): Call the dog to the front of the cage and then slip your arm around its trunk. Place one hand between the front legs and gently slide the dog over so that the body faces the same direction as you. Use the elbow to clamp its hindquarters against your side. Then apply a loose manual muzzle with the thumb over the bridge of the nose and the finger wrapped around the mandible. You may now lift the dog out of the cage to transport it.

Note: Carrying a dog requires someone wrapping both arms around all the four limbs and the body held against the handler's chest, head free and can be muzzled if suspected to bite.

Large dogs (over 15 kg): Most friendly dogs will meet you at the gate (door). You can then apply a rope around the neck. Avoid chain leashes as they may injure your hand when the dog struggles.

Nervous or aggressive dogs: These animals don't allow the handler to touch them or even touch the cage in some cases. So, attempt to win the dog by quiet, gentle urgings, while standing clear of the door. Let the dog out on its own especially for ground level cages. The animal is likely to calm down when it is out but make sure that all the possible escape routes are sealed off. If the dog cannot be talked to come out of the cage, use a capture pole or a rope leash to bring it out.

A struggling dog on a leash may be restrained by running the leash through the cage bars and snubbing the head against the door. You can use the same method as above in small dogs or use leather gloves to remove it physically. Introduce your self to the dog with partially gloved hand so that if the dog attacks, you are able to hold the scruff of its neck.

Lifting and carrying a dog (Fig 34)

The dog is approached from the sides. Sweet-talk it, pick it up and if it struggles, use more gentle language. One should always squat down and lift the dog with the legs, keeping the weight of the dog evenly distributed to avoid strain on the back. For *Large dogs*, use two people.

Fig. 34: *A lifted dog ready for carrying*

Procedure: Start by squatting. The front handler wraps around the neck and the other arm under and around the chest behind the front legs. The other handler wraps the arm around the rear parts and the other arm in front of the back legs for females and for males in front of prepuce. Lift the dog simultaneously while keeping it level. Remember to lift the dog with your legs and not your back and to sweet-talk it as you lift it. If possible, carry the dog with the arms wrapped around the front and rear legs as for caged dogs. You can use a wheeled cart (gurney) where one person steadies the dog and a second person pushes the gurney.

For small pregnant dogs, encircle the entire front and rear legs with your arms and lift. But lifting large pregnant bitches requires two people. As for puppies, they should be carried by resting their chest on your forearm with the fingers between the forelegs for better grip. The other hand can either support the head under the chin or be placed on top of the neck to reduce wiggling.

General restraint procedures

Lift a dog to the examination table and allow it to sit. For a *standing dog*, place a hand on its ramp and gently push it down

while giving the command 'sit'. Next, bring the dog's body parallel to that of the handler, and wrap one arm around the seated hind quarter; then grasp a front or hindleg using the elbow to apply pressure to keep it sitting. The position of your arms may be adjusted for different examinations as needs be. The other hand secures the head by wrapping the muzzle or cradling the dog's head inside your elbow.

Note: This technique is used for S/Q injection, examination of ears, eyes and mouth.

Oral medication for a sitting dog: For oral medication in a sitting dog, elevate the head slightly and stroke the throat while it swallows the drug in a sitting position. Use the left hand to roll the upper lip down over the upper teeth while the right hand gently pulls down the mandible. Don't let off the hand in the mouth as it can be bitten.

Standing dog: The body of the dog should be parallel to the handler when administering oral medicine.

Procedure: One arm of the handler encircles the dog's neck while the other hand is wrapped behind the rear quarters or between rear limbs. This technique can also be used for rectal examination and IM injections. For rectal examination however, grasp the tail near its base and hold it up out of the way. Part of the weight of the dog can be supported with the tail hold but too much traction should not be put.

Note: It is advisable to talk to the animal quietly while it is being handled to distract it during unpleasant procedures.

Caution: Never allow a dog to jump from examination table as it may be injured.

Restraint for medical procedures

Restraining large dogs (over 30 kg): It is advisable to handle a large dog on the floor while it is sitting or lying down. For the head examination, straddle the dog and place one hand on either side of the head. If it is likely to bite, grasp the cheeks or the scruff of the neck. For body examination, kneel and wrap one arm around the neck, use the other arm to steady the dog or hold it up.

Restraining a dog in lateral recumbency: Pick up all four limbs and let the animal slide gently to the table. You can do this alone or with a helper in case of a larger dog.

Small and medium dogs: Let the dog stand with the body parallel to yours and then reach out both hands over the dog and grasp the rear and front legs with your hands. Gently lift the dog away from you and let it slide down the front of your body until it is lying on the table. Continue holding the legs and pin the neck and hindquarters to the table with the forearms. If the dog tries to get up, increase the pressure onto the neck and lift the legs.

Large dogs: the procedure is the same as for the small (medium) dog, only that it requires two people.

Restraint for venipuncture: Venipuncture is done in the jugular vein and the cephalic vein but the choice of the site depends on the procedure to be carried out.

For administration of small amounts of IV drug or collection of small volume of blood sample, use cephalic vein. For large volumes however, use the jugular vein. Lateral saphenous vein can be used as a “back up” i.e. it can be used in the event the others fail.

In addition to restraining the dog, the handler also occludes the blood vessel proximal to the venipuncture site so that the blood vessel stands out and can be seen. The handler also applies pressure to the venipuncture site after injection or collection of blood to stop haemorrhage. All along, the handler should calm the animal down with soothing words and petting.

Jugular vein is located as for the cat and in small and cooperative dogs. With well-behaved medium size dogs, sit the dog, then with the left-hand reach around the neck and grasp the head to elevate it. Use the right hand to prevent the dog from raising its front legs.

Cephalic vein (Fig. 35): This is located on the cranial surface of the front leg.

Procedure: Sit the dog on the table. From the dog's right side, reach around its body with the left hand; grasp the head under the jaws or around the muzzle and move the body close to you for added support; then apply pressure on the dog's side with the

elbows while it sits. Next, the right hand grasps the foreleg – cradle elbow and the leg is extended by pushing it forwards. With the thumb of the right hand on top of the dog's leg, pressure is applied on the vein and rotated laterally. This straightens the vessel and makes it conspicuous. The person doing the venipuncture steadies the leg.

Fig. 35: *Cephalic vein venipuncture in a dog*

Lateral saphenous vein: This vein is curved in an 's' shape and is located laterally just proximal to the hock. The dog is put on lateral recumbency. One person then holds the head and fore limbs while the second person holds the leg. Touching on the table with one hand, he occludes saphenous vein with the other and grasps the upper hind limb in the area of hock joint. Pressure is applied behind the joint squeeze at the same time pushing the leg out to extend it. It is then venipunctured while steadying the limb.

Devices for limiting movement

Limiting movement to prevent the dog from chewing wound or bandage:

Elizabethan collar this fits around the dog's neck. It may be attached to the dog's collar or may be secured around the neck. Elizabethan collars are commercially available but can be made from plastic buckets, x-ray films, cardboards (short term) or larger

plastic bottles. Use only the material that will restrict the dog from reaching the protected area of the body. Be careful with the choice of material as home made collars have sharp edges which may injure the dog's neck. Collars may interfere with the dog's eating and drinking and so the dog should be assisted.

Side braces prevent the dog from bending its head or its neck side ways. The technique is to use an aluminium rod to make a ring of the dog's neck.

Procedure: Measure the diameter of the dog's neck with an aluminium rod which is long. Place the ring around the neck and bend the rod on either side of the circle; then run the rod parallel to the animal's side (side bar) up to the last rib. Finally, suspend the two bars at the back with a connecting tape.

Hobbies are applied over the front or hind limbs to restrict the dogs' movement. They can be made of adhesive tape by tearing two 3'-4' long pieces of 2 diameter tape. One of the tape is made shorter by about 6"-8". Next, stick the tapes together so that sticky sides meet, leaving 3"-4" of sticky side exposed on either side to be used as anchors. After this, apply around the metatarsus or carpus and stick gunning part to itself enclosing all the gunning part. Repeat for the opposite leg. Although the dog can walk, its movement is restricted.

Chemical Restraint of Cats and Dogs

General considerations

- Single drug techniques in chemical restraint of dogs and cats cause specific side effects. Nevertheless, the technique of combining drugs in reduced dosages to provide chemical restraint reduces unwanted side effects and toxicity.
- The choice of drugs for the chemical restraint of dogs and cats follows the general guidelines for other domestic animals.
- Drugs given intramuscularly or subcutaneously take 10 to 30 minutes to show their effects.

Available drugs

Single drugs and their dosages for intravenous administration (mg/kg bwt)

Drug	Dog	Cat
Acepromazine	0.1–0.4	0.1–0.6
Promazine	0.6–1.0	0.1–3.0
Diazepam	0.2–0.4	0.2–0.4
Midazolam	0.2–0.4	0.2–0.4
Xylazine	0.2–0.4	0.2–0.4
Morphine	0.4–1.0	0.1–0.2
Meperidine	0.4–1.0	0.2–0.4
Oxymorphone	0.1–0.2	–
Methadone	0.2–0.6	–
Fentanyl	0.002–0.006	–
Pentazocine	0.2–0.4	0.1–0.2
Butorphanol	0.1–0.2	–

Note: Intramuscular dosage is 2 to 3 times the intravenous dosage. Lower dosages should be used in sick patients.

Drug combinations and their dosages for intravenous administration (mg/kg bwt)

Dogs

Acepromazine (0.1–0.2) and *meperidine* (0.2–0.6).

Side effects: hypotension.

Acepromazine (0.1–0.2) and *oxymorphone* (0.1–0.2).

Side effects: hypotension.

Acepromazine (0.1) and *butorphanol* (0.2–0.4).

Side effects: bradycardia and hypotension.

Diazepam (0.2–0.4) and *fentanyl* (0.01).

Side effects: bradycardia.

Droperidol–fentanyl (Innovar–Vet) 1 ml/15–30 kg bwt.

Side effects: bradycardia and apnea.

Cats

Acepromazine (0.2) and *oxymorphone* (0.08).

Side effects: excitement.

Acepromazine (0.1) and *butorphanol* (0.2–0.4).

Side effects: hypotension and bradycardia.

6

RESTRAINT OF LABORATORY SPECIES

Birds

Caged birds such as parakeets, muses, finches, parrots, cockerels, neonates and lorries are common pets among the people living in apartments. Birds are very sensitive to stress and rough handling can easily break their wings or legs. Therefore, be patient with them and use the least restraint necessary. Their self-defence includes use of the beaks, scratching with toe acts and even the wings.

Transport to the clinic

A bird is carried in its own cage after removing all the contents except one pack. The food dish and droppings should be retained in case the veterinarian wants to evaluate them.

In cold weather, the bird can be warmed or one can use a towel or a blanket to cover the whole cage. These should however be removed in hot weather. At the clinic, the pet owner will remove the perch and food dish; then the bird can be captured for examination.

Capturing a bird

Most tame birds have been trained to hop onto one's wrist where they can be grasped from behind.

Procedure: For a small to medium sized bird, lay the bird on its back in your palm and use the index finger and thumb to steady the head. For larger birds, use one hand to steady the head and use the other hand to hold the wings and legs. With tame birds, the owner may restrain them. If the bird has to be transferred from the owner to you, the veterinarian should secure the head first, then the wings and lastly, the legs. Small to medium sized birds may be caught with one hand by uprooting them from the back and quickly but firmly, grasping them with the index finger and the thumb placed on either side of the head while the other finger holds the legs. Light leather gloves may be worn to prevent biting.

Large birds are caught with two hands approaching from the head with one hand and quickly securing the wings with the other hand. Use leather gloves to avoid injury from biting. With very antagonist birds, divert their attention with a glove or towel.

Reduced light in the cage will calm the bird. Use of a towel will help capture the bird by covering it and then grasping it but this may be difficult. A bird in a large aviary may be captured with a net and then grasped properly for restraint. One should watch out for hyperthermia in a bird frequently attempting to escape.

Restraint for medical procedures

Oral medication

Liquids are given with the bird's head elevated above the horizontal plane to prevent aspiration. The bird is restrained and if a tube has to be passed into the stomach, then the beak must be held open to prevent biting off the tube.

A paper clip or a spectrum can be used to open the beak. Application of a paper clip requires tilting the bird slightly to one side and placing the upper beak in the short-inside loop of the clip then swinging the clip down and placing the end inside the lower beak.

Injections: Could be IM or S/Q. For the S/Q injection, the head is held with the thumb and the index finger. The other hand is used to support the wings and legs. Then the wing is slowly stretched for the injection to be given in the axillary region. For the IM injection, the bird is held the same way but here, the pectoral quadriceps muscle is presented for injection.

Restraint for venipuncture: The technique is to use the right jugular or brachial vein which is located in the wing.

Jugular venipuncture: The bird is held so that the beak rests a palm or hand. Its head is then held between the index and the middle finger and turned to the left slightly extended. Feathers are held back with the thumb and then the jugular is occluded.

Brachial vein can also be used for venipuncture. The vein is exposed by holding the bird as for S/Q injection.

Restraint for ocular medication: The bird is held as for the injection and the eye being medicated is turned upwards.

Splint application: Tape splints are used for broken legs or wings.

Leg restraint: Hold the bird with one hand with its head between index finger and thumb – turn the bird into a dorsal recumbency and gently grasp the affected leg by the toes; then straighten it as desired and apply the splint.

Wing: The bird is held in an upright position with one hand steadying the leg and the other hand holding the leg, tail and the tips of the wings.

Restraint for radiography: Small to medium size birds are taped directly to the cassette and weighed down with a lead weight; but large birds can be held with lead gloves.

Elizabethan collar: This is used to prevent a bird from picking its bandage or wound. Various devices may be used including playing cards, plastic detergent bottles, pieces of cardboard, or a piece of X-ray film depending on the size of the bird.

Beak restraint: If a bird is a ferocious biter, the beak can be taped.

Restraint of Rodents , Rabbits and Ferrets

When handled firmly and gently, there is less risk of being bitten or scratched by rodents, rabbits and ferrets. Procedures like injections, examination and gastric lavage are usually carried out with the animal restrained with hands. However, procedures like cardiac puncture and orbital sinus venipuncture require general anaesthesia.

Rubber-tipped forceps are used to transfer rodents from one cage to another if they cannot be hand-held for experimental purposes.

Restraint of Gerbils

The Mongolian gerbil is inquisitive and will become tame with frequent and gentle handling. If provoked, it can be aggressive and stronger than hand limbs. Where complete restraint is not required pick a gerbil up by scooping it into your hand. Hold firmly as the animal can jump out of your hand. You can also pick it by the rail but hold it at the base of the rail to avoid pulling the skin off.

The rail is used to transfer gerbils from one cage to the other. It can also be used to start further restraint as follows:

Place the front feet onto a wire mesh and hold on to it. Grasp the loose skin on the scruff of the neck. Hold the rail and the hind limb between the 3rd and 4th fingers if necessary and place the animal on a dorsal recumbency.

Restraint of Guinea pigs

Guinea pigs are the most docile of all the pocket pets for they rarely bite and will only scratch while trying to escape.

Procedure: Pick up a guinea pig by grasping over the shoulder and wrapping your fingers around the chest. Lift the animal and place the other hand under the rump to support the spine. The animal will stand vertically. You can also hold it upside down (opposite of above) – then rest it in a dorsal recumbency in your hands.

Restraint of Hamsters

Hamsters require frequent handling to keep them tame. Aggressive hamsters will roll on to their backs with the teeth flashing or by

chattering and screaming as you reach into their cage. Because they are nocturnal in nature, they sleep during the day. Before handling, alert them in order to avoid being bitten. Also, do not offer your finger for sniffing as they can bite.

Due to the presence of cheek pouches, it is important to note the following: -

- It is difficult to handle hamsters by the scruff of the neck when the pouches are full. Be careful to hold as much of the scruff as possible to avoid being bitten if the animal turns around.
- Picking up and holding a hamster involves placing the palm down over the hamster, wrapping fingers over the entire body with the head pointed towards your wrist, then turning it quickly on its back.
- *Use of a can* - hamsters will usually crawl into a can placed in front of them.
- You can scoop up a hamster like a gerbil.

Restraint of Mice

Mice may be scary when frightened and tend to be skittish and chirp. They may bite if handled roughly.

To pick up a mouse: Grasp the mouse by the rail, lift it quickly and place its front feet on a wire mesh or rough surface and pull backwards gently. Then gently grasp the loose skin behind the ears and lift the animal after which you flip it over and restrain one hind limb. If you want to hold the mouse or the tail for a long time, gently bounce or jingle the mouse to keep it off balance and distract its attention to prevent biting.

Restraint chambers: They have opening for the tail or legs where injections can be administered. It is to be noted that, it is usually hard to get a mouse into the chamber as some can turn around. Therefore, a syringe case with a slit cut on one side may be used as a restraint.

Restraint of Rats

Rats are intelligent animals and are therefore, easily trained. They will squeal when lifted or first captured and bite if provoked. Be

confident and firm when approaching a rat for hesitation can result to a bite.

Picking up a rat

Procedure: One hand is placed around the chest, then the thumb and the index finger are wrapped around the neck under the chin to lift the rat. Young rats can be lifted by picking the base of the tail but one should be gentle to avoid removal of the skin.

Restraint of Rabbits

Rabbits range in weight from 2–20lbs. Aggressive rabbits will stomp their feet and rush at the cage door when the door is opened. Some may even growl. In order to handle aggressive rabbits, wear gloves and use a towel or a blanket that can be thrown over their body until a better hold is achieved. Never lift a rabbit by the ears as this may injure the animal.

To lift up a grown up rabbit: Grasp the scruff of the neck and lift it quickly while supporting the rabbit's rump with your other hand.

To lift an immature rabbit: A mature rabbit can be lifted and carried by holding the skin over the back.

Make sure that its feet pointed away from you in order to avoid scratching.

Carrying rabbits: Tuck the rabbit's head into the crook of your elbow with its body resting on your forearm and the other hand holding on to the scruff of the neck. This is comfortable for the rabbit and it will not resist the hold.

Restraint on an examination table: Start by placing a towel or mat on the table before placing the animal there. A smooth surface will make the rabbit nervous thereby causing it to scramble around in an effort to find stable footing.

To examine the underside of a rabbit: Grasp the scruff of the neck in one hand and the back legs with the other hand. Stretch it along the forearm or hold the rabbit by the scruff of the neck with the back against your body. Then gently stroke the animal's belly. It will relax and can now be examined.

Hypnosis: Can be used to make a rabbit lie still on its back.

Procedure: Grasp the mandible with one hand and the rear legs with the other hand and stretch the rabbit on to the table. Then gently tilt the head backwards until the rabbit suddenly relaxes (maintain the hypnosis). An anxious rabbit can be mesmerized while on its feet by covering the eyes with your hand and applying gentle pressure on its temples.

Intramuscular injection restraint: Hold the rabbit by scruff of the neck with one hand and support the back with the other hand. Then set the rabbit's rear on the table and lean it backwards against your body to enable you grasp the hind limb. Then inject.

Restraint devices in rabbits: These include towels, bleeding boxes, and rabbit boards. A towel wrapped tightly around a rabbit has a calming effect and prevents it from biting. Required also is a bleeding small box that holds the rabbit's body and has a space for ears to be extracted or entire body to protrude. A rabbit board that looks like a restraining trough used for pigs but smaller will also do.

The feet are tied as we saw in the pig restraint but a rabbit is hypnotised before placing onto the trough.

When restraining a rabbit by holding the scruff of the neck, always release the other parts before the scruff so that the rabbit does not jump over after the hind limbs are released. When returning it into a cage, place the rear legs first while retaining your hold on the scruff. Release the scruff last.

Restraint of Ferrets

Most ferrets are easily held, easily tamed and rarely bite and if they do so, quickly release their grip. Females with young ones are usually protective and should be restrained with care. A difficult ferret can be restrained like a rat with the hand over its shoulder and fingers wrapped around the chest.

Chemical Restraint of Laboratory Species

General considerations

Laboratory species respond differently to chemical restraint and immobilisation than do domestic animals. Most of them are prone to stress on handling and have high sympathetic drive. Complications of stress include hypertension, arrhythmias, and hyperthermia, which can lead to death. Like in domestic animals, there is need to carry out a physical and laboratory evaluation of these species before administration of the drugs for chemical restraint.

Maintenance of homeothermy

It is important to maintain homeothermy after the administration of drugs for chemical restraint in most laboratory species as most of them are small and lose heat rapidly. This is further compounded by their high surface area to volume ratios. For instance, ectotherms (reptiles, fish, and amphibians) do not generate their own heat and therefore require external heat sources to maintain their body temperature. Even well insulated small animals such as rabbits and chinchillas are susceptible to hyperthermia.

External heat sources

These should be selected well to avoid iatrogenic burns and hyperthermia. They can be selected from electric heating pads, water circulating heating pads, incubators and hot water bottles. It is important to always monitor external heating sources.

Available drugs

Avian

Diazepam and *midazolam* are the most efficacious drugs for avian chemical restraint.

Diazepam: 0.5–1.0 mg/kg bwt, IM

Midazolam: 0.5–1.0 mg/kg bwt, I.M.

For ratites, storks and long-legged wading birds weighing more than 15 kg, the following drugs can be used:

Xylazine: 0.2–0.4 mg/kg bwt, IM.

Tiletamine-zolazepam (Telazol): 2–5 mg/kg, IM.

If anaesthesia is required, the following can be used:

- Birds weighing less than 250 g: ketamine 30 mg/kg bwt, IM. others: ketamine (10-30 mg/kg bwt, IM) and xylazine (1-3 mg/kg bwt, IM).
- Smaller birds: diazepam (0.5-1.0 mg/kg bwt) and ketamine (10-15 mg/kg bwt IM), tiletamine-zolazepam (Telazol): 4-25 mg/kg bwt, IM.

Notes: All intramuscular injections should be administered into the pectoral muscles. Recovery from injectable anaesthetics is variable but usually takes > 45 minutes.

Rodents

Rodents will require atropine sulphate premedication in order to decrease airway secretions before the administration of any drugs for their restraint.

The following are the dosage guidelines for atropine sulphate:

- 0.04 mg/kg bwt, IM (SC in rat, mouse, hamster, gerbil).
- 0.2 mg/kg bwt, IM (SC in guinea pig, chinchilla).
- 0.2 mg/kg bwt, IM (SC in rabbit).

Sedation and anaesthesia of the rodents

Species	drug	dosage
<i>Sedation:</i>		
Rat, mouse, hamster, chinchilla, gerbil	diazepam	3–5 mg/kg, IM
Guinea pig	diazepam	0.5–3.0 mg/kg, IM
Rabbit	diazepam	1–4 mg/kg, IM
All but gerbils	acepromazine	1–2 mg/kg, IM
<i>Anaesthesia:</i>		
Rat, mouse	ketamine	60–80 mg/kg, IM
	xylazine	7–15 mg/kg, IM
Rabbit, guinea pig, chinchilla	ketamine	30–40 mg/kg, IM
	xylazine	5–8 mg/kg, IM
Hamster, gerbil	ketamine	50 mg/kg, IP
	xylazine	2–5 mg/kg, IP
Rat, mouse, guinea pig	ketamine	20–40 mg/kg, IM
	acepromazine	0.75 mg/kg, IM
	xylazine	2–5 mg/kg, IM.

Note: Acepromazine should be avoided in gerbils as it can cause seizures.

Mustelids (Ferrets)

Several drugs and drug combinations are available for chemical restraint of mustelids following their premedication with atropine sulphate (0.04 mg/kg bwt, IM, SC):

- *acepromazine*: 0.1-0.5 mg/kg, bwt, IM
- *diazepam*: 2-3 mg/kg; IM; tiletamine-zolazepam (Telazol): 3-5 mg/kg bwt, IM (light sedation) 8-12 mg/kg bwt, IM (anaesthesia)
- *ketamine*: 20-25 mg/kg bwt, IM
- *ketamine*, 25-35mg/kg and acepromazine, 0.2-0.3 mg/kg, bwt (both drugs IM)

- *ketamine*, 10-20 mg/kg bwt, and xylazine, 2.2 mg/kg, bwt (both drugs IM).

Reptiles

Most reptiles can be immobilised using isoflurane via a mask or in a chamber at 2% to 4% isoflurane.

Injectable drugs for reptile restraint include:

- *ketamine*: 20–60 mg/kg bwt, IM (suitable for snakes, lizards and terrapins).
- *ketamine*: 5–15 mg/kg bwt, IV
- *tiletamine-zolazepam (Telazol)*: 10–40 mg/kg bwt, IM (squamates) 5–15 mg/kg bwt, IM (chelonians, crocodilians).

Amphibians

Since significant respiration in amphibians occurs across moist skin, their skins should not be allowed to dry out completely. They should be handled with wet latex gloves or wet hands. Agents used for their immobilization include:

- *Tricaine methane sulphonate* (3-aminobenzoic acid ethyl ether; ethyl m-aminobenzoate; MS 222; Funquel). This is applied in an immersion bath at a rate of 50-100 mg/l of water. Always keep a tank of untreated water for a recovery.
The same agent can be injected subcutaneously or intramuscularly at a rate of 100-mg/kg bwt (0.1-ml/10 g bwt of a 1% solution).
Induction takes 5-20 minutes and recovery is in 10-30 minutes.
- *Ketamine*: 100-200 mg/kg bwt, SC or IM.
Recovery occurs in 20-60 minutes.

Precaution: unneutralised MS222 produces toxic conditions if exposed to direct sunlight or if used in salty water.

Fish (Freshwater and Marine Fish)

General considerations

Indications for chemical immobilisation of fish include sedation during shipping, diagnostic imaging, and stripping milt or eggs. The following are important considerations.

- Fish are obligate water breathers and require oxygenated water moving over gills to oxygenate their blood.

- Normal water flow pattern is through the mouth, over gills and out of the operculum.
- Provide water flow during chemical immobilisation/ anaesthesia using frequent immersion or a small re-circulating pump and airstone.
- A pump tube should be placed in the mouth of the fish to maintain water flow across the gills.
- Since the exterior mucus layer is an important part of the fish integument, use minimum restraint so as not to disrupt it.
- Use of wet latex gloves during handling of fish is advocated for.
- If anaesthesia is to be induced, starve the fish for 24 hours before anaesthesia.
- A recovery tank with fresh water should always be available.
- Maintain adequate body temperature with external heat sources.

A wide variety of agents such as heavy alcohols, ether, chloroform, brominated alcohols, barbiturates, chloral hydrate, urethane, quinaldine, and tricaine methane sulphonate (MS222) have been used, and with care, they can all be used safely to restrain fish for experimental purposes. The following substances are however, the safest and most effective:

Benzocaine

This is a cheap and very effective anaesthetic, which has been found to be more effective than MS222. To anaesthetise fish under normal field conditions, dissolve 0.2 g benzocaine in 5 ml acetone and then add to 8 litres of water. Fish immersed in this solution should be immobilised effectively.

Precaution: exposure of this mixture to direct sunlight should be avoided as this can lead to breakdown and release of highly toxic chlorine.

Tricaine methane sulphonate (MS222)

This has limited use largely because of its high cost. It is most useful in calming fish during transit as well as producing rapid induction (1 to 3 minutes) of anaesthesia. Fish recover in 3 to 15 minutes. It is applied in an immersion bath or tank at a rate of 50 to 100 mg/L of water.

Precaution: Tricaine methane sulphonate produces toxic conditions when used in salty water or in direct sunlight.

7

RESTRAINT OF WILD SPECIES

Chemical Restraint

General considerations

Occasionally, veterinary practitioners have to undertake various procedures on non-domesticated animal species. Some of these procedures can be carried out with sedation and tranquilization alone while others may require general anaesthesia using injectable or inhalation agents. However, although inhalation anaesthesia can be used on most species with excellent results, its administration would be difficult without some form of initial restraint.

Chemical restraint using injectable intramuscular agents is ideal for this purpose. These agents are administered either by dart gun, blow dart, pole syringe or hand syringe.

Recommended needle specifications for dart syringes in different species:

Species	Needle specification
Elephant, rhino, hippo, giraffe	3 x 60 mm
Elephant calves, buffalo, young giraffe	2 x 50 mm
Blue wildebeest, waterbuck, kudu, zebra, etc.	2 x 35/40 mm
Lion, leopard, cheetah, wild dog, impala, etc.	1.5 x 25 mm

Available drugs for chemical restraint of various wild animal species

Primates

The most commonly used drug for immobilising primates is ketamine. In the restraint for minor procedures, a dosage of 8–10 mg/kg bwt, IM, is adequate, but for surgical anaesthesia, a dosage of 15–30 mg/kg bwt, IM, will be adequate.

Otherwise, general dosage guidelines are:

Small primates:	20–30 mg/kg bwt, IM.
Medium sized primates:	10–20 mg/kg bwt, IM.
Great Apes:	6–10 mg/kg bwt, IM.

Note: Initial restraint dosage may be followed by maintenance with inhalation agents if desired.

Rodents

Rodents are easily immobilised in an inhalation chamber using inhalation agents like halothane or methoxyflurane. Intramuscular agents that can be used are:

Ketamine – 4.4 mg/100 g bwt (in small species)
 11.0 mg/kg bwt (in larger ones)

These will provide short-term immobilisation.

Note: Addition of xylazine (3–5 mg/kg bwt), promazine (1–2 mg/kg bwt) or acepromazine (0.75–1.0 mg/kg) will result in longer immobilisation with more complete relaxation.

Rabbits

These can be immobilised using inhalation anaesthesia in Bell jars or chambers or 35-50 mg/kg bwt of ketamine and 5 mg/kg bwt xylazine IM.

Insectivores (tenrecs, hedgehogs, shrews, moles)

These can be immobilised using inhalation anaesthesia in Bell jars or chambers. A useful injectable combination for their immobilisation is ketamine (1–2 mg/100 g bwt) and xylazine (0.2 mg/100 g bwt), IM.

Felines

Wild felines are treated like domestic cats. For their immobilisation, ketamine (10–20 mg/kg bwt, IM) and xylazine (2 mg/kg bwt, IM) provide immobilisation for 15 to 20 minutes. Additional maintenance doses can be given if required; otherwise, inhalation agents can be given for longer periods of anaesthesia. Alternatively, use Tiletamine-zolazepam (Tetazol) at a dosage of 1.5-4.0 mg/kg bwt, IM, for their immobilisation.

General guidelines for ketamine dosages are:

Small cats:	20-35 mg/kg bwt, IM.
Medium sized cats:	10-20 mg/kg bwt, IM.
Large cats:	5-10 mg /kg bwt, IM.

Canids

Wild canids are treated like domestic dogs. A ketamine (10 mg/kg bwt, IM) and xylazine (2 mg/kg bwt, IM) combination gives 15 to 20 minutes of immobilization. Supplemental doses can be given if prolongation of immobilization is desired.

Racoons and otters

To immobilise racoons and otters, a ketamine (15 mg/kg bwt) and xylazine (2 mg/kg bwt), combination injected IM will be adequate.

Bears

Most bears can be immobilised using the ketamine/xylazine combination.

Dosages

Ketamine (4-10 mg/kg bwt) and xylazine (2-mg/kg bwt) both injected intramuscularly.

Elephants, rhinoceros, tapirs, zebras

Etorphine hydrochloride (M99) given intramuscularly is the drug of choice. This drug has an antagonist diprenorphine hydrochloride (M50-50) which should be given intravenously at 2-3 times the etorphine dose to reverse its effects.

General dosage guidelines for M99:

Elephants:	4-8 mg total dose, IM.
Rhinoceros:	2-4 mg total dose, IM.
Tapirs:	1-3 mg total dose, IM.
Zebra:	2-5 mg total dose, IM.

Note: xylazine (0.2-0.5-mg/kg bwt, IM) may be used with etorphine to effect a smooth immobilisation in these animals.

Other wild ruminants

Etorphine (M99) is the drug of choice for immobilisation of other wild ruminants. Its antagonist, diprenorphine should be given at 2-3 times the etorphine dose, IV, to reverse its effects. Etorphine can also be combined with xylazine (0.2-0.5-mg/kg bwt, IM) for immobilisation of these animals.

General dosage guidelines for etorphine are:

Ruminants less than 50 kg:	0.5-2.0 mg total dose.
Ruminants of 50-125 kg:	1.5-3.0 mg total dose.
Ruminants more than 125 kg:	3.0-5.0 mg total dose.

It should be noted that an effective dose of etorphine for immobilising of wild ruminants is more species-dependent rather than weight-dependent.

The following are the dosage (total dose) guidelines for selected wild ruminant species:

Camels	2-4 mg, IM.
Ilama	1-3 mg, IM.
White tailed deer	3-6 mg, IM.
Giraffe	3-8 mg, IM.
Greater kudu	4-7 mg, IM.
Eland	5-10 mg, IM.
Gazelle	2-3 mg, IM.
Impala	0.75-1.25 mg, IM
Bushbuck	0.75-1.25 mg, IM
Buffalo	6-10 mg, IM
Wildebeest	2-4 mg, IM

Alternative drugs for immobilisation of the above wild ruminants are:

Fentanyl- at dosages 10 times that of etorphine

Carfentanil- at dosages approximately 1/5 less than that of etorphine.

Crocodile

Crocodiles can be immobilised using zolazepam-tiletamine (Telazol) at a dosage rate of 3–5-mg/kg bwt, IM.

An alternative to zolazepam-tiletamine is Gallamine triethiodide (Flaxedil).

The following dosage guidelines can be followed:

Crocodile length in meters	Flaxedil in ml. of 40mg/ml solution
1	0.15
1.5	0.6
2	1.2
2.5	2.5
3	4.5
3.5	6.0
4	7.5
4.5	9.3
5	10.0

The reversal agent for this drug is Neostigmine 0.05-2.0 ml of a 2.5-mg/ml solution, IM.

Ostrich

The following drugs can be used to immobilise ostriches:

Tiletamine-zolazepam (Telazol): 5.0 mg/kg bwt, IM and *diazepam (Valium)*: 1.0–2.0 mg/kg bwt, IV. The diazepam helps to counteract violence on waking up.

Etorphine: 6.0 mg/kg bwt and *xylazine*, 200-mg total dose or *ketamine*, 200 mg total dose- for adult males.

Hyaenidae (Hyenas)

The following drugs can be used to immobilise hyenas:

Tiletamine-zolazepam (Telazol): 5.0 mg/kg bwt, IM.

Ketamine: 10–15 mg/kg bwt and *xylazine*, 0.5–1.0 mg/kg bwt, IM.

Etorphine: 0.005 mg/kg bwt, IM.

Fentanyl: 0.05 mg/kg bwt, IM.

Xylazine: 0.5 mg/kg bwt, IM.

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APPENDIX

Gender names

<p>(a) Cats Male: <i>Tom</i> Female: <i>Queen</i> Castrated male: <i>Chevon</i></p>	<p>(b) Cattle Male: <i>Bull</i> Female: <i>Cow</i> Young male: <i>Bullock, bull calf</i> Young female: <i>Heifer</i> New born: <i>Calf</i> Castrated male: <i>Steer</i> Castrated male for working: <i>Ox</i></p>
<p>(c) Dog Male: <i>Dog</i> Female: <i>Bitch</i> New born/young: <i>Puppy</i> Castrated male: <i>Wether</i></p>	<p>(d) Ferrets Male: <i>Hob</i> Female: <i>Jill</i> New born/young: <i>Kit</i></p>
<p>(e) Goat Male: <i>Billy or Bach</i> Female: <i>Nanny or Doe</i> Young/new born: <i>Kid</i></p>	<p>(f) Horse Male: <i>Stallion or stud</i> Female: <i>Mare</i> Young male: <i>Colt</i> Young female: <i>Filly</i> Newborn: <i>Foal</i> Castrated male: <i>Gelding</i></p>
<p>(g) Pigs Male: <i>Boar</i> Female: <i>Sow</i> Male castrated after maturity: <i>Barrow</i> Male castrated before maturity: <i>Stag</i> Young female: <i>Gilt</i> Young of either sex: <i>Shoat</i> Newborn: <i>Piglet</i></p>	<p>(f) Rabbits Male: <i>Buck</i> Female: <i>Doe</i> Newborn/young: <i>Kindling</i></p>
<p>(i) Sheep Male: <i>Ram or buck</i> Female: <i>Ewe</i> New born/young: <i>Lamb</i></p>	

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