

The Equine Veterinary Nursing Manual

EDITED BY

Karen M Coumbe

MA VetMB CertEP MRCVS
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Near Maidstone
Kent ME18 5GS
UK

For the **BRITISH EQUINE VETERINARY ASSOCIATION**

b

Blackwell
Science



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Nursing Manual

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DISCLAIMER: Every effort has been made to check the few drug dosages given in this book. However, as it is possible that dosage schedules have been revised, the reader is *strongly advised* to consult the companies' literature before administering any form of medication.

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Foreword

The dramatic advances in equine medicine and surgery of the last twenty-five years, have necessitated the development of a group of support staff, which has carried the label of 'equine nurses'. They have performed increasingly sophisticated duties with skill and good humour, but illegally! Schedule Three of the Veterinary Surgeons Act in the UK has specifically precluded the nursing of equidae. Not surprisingly, there has been an increasing clamour for this apparently illogical law to be changed. I am delighted to say that after much hard work behind the scenes by the Royal College of Veterinary Surgeons, the British Equine Veterinary Association and the British Veterinary Nursing Association, the situation is about to be remedied. In fact the year 2000 saw the first batch of qualified Equine Veterinary Nurses (EVN).

Currently these people must already have achieved VN status, before sitting the examination. However it is hoped that the qualification will be available soon to people who do not wish to undergo training in small animal nursing.

How appropriate it is then, to welcome the first book devoted to the subject of equine nursing.

The gestation of the manual was under the care of Karen Coumbe who has had a particular interest in equine nursing and who was one of the first examiners for the EVN Certificate. She has had the most demanding task of obtaining manuscripts from a variety of highly experienced clinicians, scientists and nurses, whilst simultaneously nurturing her own second child; two major achievements!

I would like to congratulate her in particular and all those involved with the production of what I confidently expect to become the definitive work on the subject.

As a surgeon I have always recognised the value of highly trained nursing staff. I have also had the good fortune to have been involved with the challenge of setting up an officially recognised equine nursing qualification. Although there is clearly still much work to do, the future of equine nursing in the UK is secure. Furthermore, there is potential for the evolution of a profession with its own specialties, which will provide satisfying opportunities for people with an equine interest, who want a career in veterinary nursing.

Tim Greet FRCVS
(Immediate Past President of the British
Equine Veterinary Association)

Preface

The purpose of this manual is to provide the definitive textbook for equine veterinary nurses. It will also be useful to all those involved in the care and management of the sick horse. There are a multitude of excellent books available on managing the well horse. For this reason, the basics of equine management such as routine bandaging techniques are not included here, since they are well explained elsewhere. Instead the aim of this book is to provide new information on the care and consideration, as well as the art and science involved in looking after any sick horse or pony.

The Royal College of Veterinary Surgeons has devised an extremely detailed objective equine veterinary nursing syllabus, which this book has followed as comprehensively as possible. This explains the breadth and depth of subject matter. The authors include some of the first veterinary nurses to obtain the qualification in Equine Veterinary Nursing (EVN), following the first examinations held in July 2000. They are to be congratulated on

writing their chapters and passing the exam in the same year! Also included amongst the authors, are many of those involved in drafting the original syllabus and all those involved in examining for this qualification. As such it should be a very useful guide for any would be equine nurse. Horses should benefit from those who read it and so improve their knowledge of equine nursing and welfare.

I am extremely grateful to all the contributing authors for all their hard work and for the many people who helped and advised throughout the project. In particular Adam Coumbe, Sue Dyson, Louise Harvey, Tim Mair, Katie Snalune and Sarah Stoneham provided invaluable editorial assistance and advice.

This is the first edition of a textbook on a new syllabus on the evolving subject of equine nursing. Inevitably there will be areas that need improvement, but I hope this is a suitable start. Feel free to comment and constructively criticise.

Karen Coumbe
Kent
Easter 2001

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Abbreviations and Acronyms

ACTH	adrenocorticotrophic hormone	EGT	exuberant granulation tissue
ADH	antidiuretic hormone	EHV	equine herpes virus
AI	artificial insemination	EIPH	exercise-induced pulmonary haemorrhage
ANS	autonomic nervous system	EIV	equine influenza virus
AP	alkaline phosphatase	ELISA	enzyme-linked immunosorbent assay
ASA	American Society of Anaesthesiology	EMEA	European Medicines Evaluation Agency
ASIF	Association for the Study of Internal Fixation	ERS	equine rhabdomyolysis syndrome
AST	aspartate aminotransferase	ERV	equine rhinovirus
BAL	bronchoalveolar lavage	EVA	equine viral arteritis
BAR	Bright Alert Responsive	EVN	equine veterinary nurse
BP	blood pressure	FEI	Federation Equestre Internationale
BUN	blood urea nitrogen	FFA	free fatty acid
BW	bodyweight	FFD	film focal distance
CBC	complete blood count	FSH	follicle-stimulating hormone
CD	controlled drug	GGE	glyceryl guaiacolate ether
CDE	common digital extensor	GGT	gamma-glutamyl transferase
CFT	complement fixation test	GIT	gastrointestinal tract
CID	combined immunodeficiency disease	GLDH	glutamate dehydrogenase
CNS	central nervous system	GnRH	gonadotrophin-releasing hormone
COPD	chronic obstructive pulmonary disease	GSL	general sales list medicine
COSHH	Control of Substances Hazardous to Health	Hb	haemoglobin concentration
CPK	creatinine phosphokinase	hCG	human chorionic gonadotrophin
CPR	cardiopulmonary resuscitation	HSAWA	Health and Safety at Work Act
CRT	capillary refill time	HSE	Health and Safety Executive
CSF	cerebrospinal fluid	HYPP	hyperkalaemic periodic paresis
CT	computed tomography	ICF	intracellular fluid
CVS	cervical vertebral stenosis	ICL	inferior check ligament
DCP	dynamic compression plate	ILRD	infectious lower respiratory tract disease
DDF	deep digital flexor	IPPV	intermittent positive pressure ventilation
DDSP	dorsal displacement of the soft palate	IURD	infectious upper respiratory tract disease
DE	digestible energy	LDH	lactate dehydrogenase
DM	dry matter	LH	luteinising hormone
DOD	developmental orthopaedic disease	LMN	lower motor neurone
ECF	extracellular fluid	MAC	minimum alveolar concentration
eCG	equine chorionic gonadotrophin	MCH	mean corpuscular haemoglobin
ECG	electrocardiogram		
EDTA	ethylenediaminetetraacetic acid		
EED	early embryonic death		

Abbreviations and Acronyms

MCHC	mean corpuscular haemoglobin concentration	RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
MCV	mean corpuscular volume	RJB	Robert Jones bandage
MDP	methylene diphosphonate	RLN	recurrent laryngeal neuropathy
MRI	magnetic resonance imaging	RPA	radiation protection advisor
MSH	melanophore-stimulating hormone	RPS	radiation protection supervisor
NE	net energy	SCBC	subchondral bone cyst (<i>see</i> OCLL)
NILRD	non-infectious lower respiratory tract disease	SDF	superficial digital flexor
NIURD	non-infectious upper respiratory tract disease	SDH	sorbitol dehydrogenase
NMS	neonatal maladjustment syndrome	SFT	superficial flexor tendon
NRC	National Research Council	SL	suspensory ligament
NSAID	non-steroidal anti-inflammatory drug	SOP	standard operating procedure
OCLL	osseous cyst-like lesion	SRH	single radial haemolysis
OP	organophosphate	STA	Special Treatment Authorisation
P	pharmacy medicine	STH	somatotrophic hormone
PAS	perinatal asphyxia syndrome	TBW	total body water
PCR	polymerase chain reaction	TL	tracheal lavage
PCV	packed cell volume	TPN	total parenteral nutrition
PET	polyethylene tube	TPR	temperature, pulse and respiration
PLGE	protein-losing gastroenteropathies	TRH	thyroid-releasing hormone
PML	pharmacy and merchant's list medicine	TSBA	total serum bile acid estimation
POM	prescription-only medicine	TSH	thyroid-stimulating hormone
PTH	parathyroid hormone	TSO	The Stationery Office
QAR	Quiet, Alert, Responsive	UMN	upper motor neurone
QAU	Quiet, Alert, Unresponsive	USP	US Pharmacopeia
RBC	red blood cell	VHS	Video Home System
RCVS	Royal College of Veterinary Surgeons	VMD	Veterinary Medicines Directorate
RIA	radioimmunoassay	VMP	veterinary medical product
		VN	veterinary nurse
		WBC	white blood cell
		WSW	written system of work

Basic Management

L. C. Marlborough & D. C. Knottenbelt

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Veterinary legislation

The Veterinary Surgeons Act 1966

Accessibility and accountability are expected of every self-regulating profession. The Veterinary Surgeons Act 1966, which governs the veterinary profession, aims to protect the public interest by ensuring a high level of education and training, combined with personal and professional integrity. Section 19 of the Act restricts the practice of veterinary surgery to registered members of the Royal College of Veterinary Surgeons (RCVS) with a number of exceptions. This includes treatment by listed veterinary nurses in accordance with the Schedule 3 (Amendment) Order 1991.

Schedule 3 procedures

Under this Schedule the privilege of giving medical treatment and carrying out minor surgery, not involving entry into a body cavity, is given to listed veterinary nurses (VNs), including equine veterinary nurses (EVNs), under the direction of a veterinary surgeon employer to companion animals under the employer's care. Any VN is not, however, entitled independently to undertake either medical treatment or minor surgery. A student VN learning to perform or performing Schedule 3 procedures must be under the direct and constant supervision of a vet at all times. When a VN is negligent, the liability may rest in part with the directing vet. Equally, nurses must be

responsible for their own actions. At the time of writing, Equidae are not included as companion animals under Schedule 3. Legislation may change, possibly as the result of some form of exemption order. The power to delegate acts of veterinary surgery is currently under review.

The RCVS Guide to Professional Conduct

Vets and VNs must follow the RCVS *Guide to Professional Conduct*, in which animal welfare is paramount. Also emphasised are client and colleague relationships and trust, the integrity of veterinary certification and compliance with legal obligations with respect to veterinary medicinal products.

Points that are particularly relevant for equine nurses include:

- (1) Responsibility to patients:
 - (a) patient welfare,
 - (b) provision of a 24-h emergency service (immediate first aid and pain relief are vital),
 - (c) maintenance of proper standards in practice premises and equipment in relation to inpatient care.
- (2) Responsibility to clients:
 - (a) the client is the person who requests professional services for an animal,
 - (b) clear information about practice arrange-

- ments and out-of-hours services should be provided,
- (c) comprehensive case records and accounts should be kept,
 - (d) the client's informed consent to treatment should be obtained, unless delay would adversely affect the animal's welfare,
 - (e) the client must be aware if procedures are to be performed by staff who are *not* vets,
 - (f) the client's concerns and wishes must be considered where these do not conflict with the patient's welfare.
- (3) Responsibility to the general public:
- (a) reporting to the appropriate authority any suspected occurrence of notifiable disease or adverse reaction to medication,
 - (b) promoting responsible animal ownership.
- (4) Responsibilities in relation to professional colleagues: poor relationships between vets and VNs undermine public confidence in the whole profession.
- (5) Legal responsibilities: vets and VNs should be familiar with and comply with relevant legislation, including:
- (a) Veterinary Surgeons Act 1966,
 - (b) Medicines Act 1968,
 - (c) Health and Safety at Work, Radiation Protection and Control of Substances Hazardous to Health (COSHH) legislation,
 - (d) Data Protection Acts 1984 and 1999 as they apply to professional and client records,
 - (e) Protection of Animals Act 1911,
 - (f) relevant employment legislation, e.g. Employment Rights Act 1996.
- (6) Disclosure of records:
- (a) client confidentiality—with certain exceptions relating to disclosure of information to insurance companies (undertaken by vets), no information about clients or their animals must be disclosed to any third party,
 - (b) case records and client details—all notes must be comprehensible and legible.
- (7) Maintaining practice standards:
- (a) Support staff, including VNs, should not suggest a diagnosis or give any clinical

opinion to an owner, but their nursing input and opinion is invaluable in clinical care,

- (b) veterinary nurses should discharge animals only on the instructions of a vet,
 - (c) continuing professional development is vital for both vets and VNs to ensure the continuous progression of capability and competence, it is essential to keep up to date with continual changes and developments in knowledge and nursing skills.
- (8) Euthanasia: the Protection of Animals Act 1911 states that failure to destroy an animal to prevent further suffering may amount to cruelty. The duty to destroy falls on the vet, who has the skill and training to make the correct assessment. Firearms are still used for this purpose by many equine vets. Proper storage and management of firearms is essential (see Chapter 9 and contact the police for further information).

Stable management and inspection

Medical reasons for stabling

For nursing horses, stabling is often essential, e.g. for long-term orthopaedic problems requiring continued box rest:

- Monitoring of intensive-care patients usually requires the horse to be stabled.
- It may be necessary to advise owners to keep horses stabled or part-stabled as a preventative measure for certain conditions such as laminitis, *Culicoides* midge bite hypersensitivity (sweet itch) or horses suffering from mud fever or rain scald.
- Stabling is required in situations where isolation is desirable.

Requirements of a stable

Good hygiene is essential. With the large throughput of animals in an equine hospital, there may be an increased risk of infections, e.g. salmonellosis. Stable building requires planning permission and the conversion of existing buildings may be difficult.

Appropriate professional expertise should be sought.

General considerations of a stable

- Stables should be warm and dry and have adequate drainage.
- Stables should be easy to clean and disinfect, particularly in hospital situations.
- All precautions should be taken to minimise the risk of fire.
- Ventilation, lighting and water and food provision should be considered.

Water provision

Adequate clean water always should be available:

- (1) Automatic water bowls are efficient but they must be checked regularly to ensure that they are working and a back-up supply of buckets should be available. A major drawback of automatic fillers in an equine hospital is that monitoring the water intake is impossible.
- (2) Water buckets should be cleaned and refilled daily. Buckets can be secured in holders, old tyres or on hinged rings off the ground to prevent them from being knocked over.

Food provision—mangers

- (1) Mangers should be easy to clean. Ideally, mangers should be large, broad and have a completely smooth surface with all corners well rounded.
- (2) Mangers on the floor reproduce the horses' natural way of eating. For some medical conditions, e.g. sinusitis, it may help the horse to eat from floor level to enable good sinus drainage.

Food provision—hay

- (1) Hay racks fitted above head level oblige the horse to feed at an unnatural level and there is a risk of getting dust and seeds in the eyes.
- (2) Hay nets are commonly used and are useful. However, they should be tied high enough to prevent the horse getting tangled when it rolls.

This is more of a danger in horses shod with long-heeled shoes.

Hay nets should be tied with quick-release knots and attached to twine that will break easily if the horse gets caught and struggles.

- (3) Hay also may be fed on the floor, reproducing the natural way a horse eats.
- (4) Sometimes it may be desirable to scatter the feed around the bed in order to encourage the horse to forage and take longer over eating a limited quantity of food. This practice can be useful for horses on a restricted diet, e.g. those with laminitis.

Food provision—feed stores

Biosecurity of feed stores is very important. Rodent control programmes should be in place in all equine hospitals.

Stable fittings

Fittings should be minimal and, where possible, flush with the walls with no sharp projections. Firmly fixed rings at shoulder level for tying the horse to, and another ring at eye level for a hay net, should be the minimum requirements.

Ventilation

Good ventilation is particularly important for stabled horses:

- (1) There is a tendency among horse owners to see large well-ventilated stables as being too cold. Rugs can provide extra warmth but still permit the horse adequate fresh air.
- (2) Often, windows and top doors are the main source of ventilation. Windows should be arranged so that they can be opened with an inward slant while ideally being protected by iron bars.
- (3) In barns, louvre boards at the apex of the roof are ideal. These consist of two or more overlapping boards separated from each other by a few inches and set at such an angle that the elements cannot enter. Wind blowing across the top of buildings

will aspirate air. Heat loss from horses also causes air to rise within the building. These factors contribute to the upward and outward flow of air, called *the stack effect*.

In many barns, large doors at one or both ends allow an influx of air. Wind blowing from side to side and end to end is known as *perflation*. Yorkshire boarding assists perflation.

- (4) Barns often have better ventilation than individual loose boxes. However, there are disadvantages in that a group of horses share the same air space, which can encourage the spread of respiratory disease. In addition, hay and straw are commonly kept in the same air space and can exacerbate respiratory diseases.
- (5) Draughts should be avoided, particularly in foal accommodation.
- (6) Mechanical ventilation can be employed in long or wide buildings.
- (7) In a stable with a monopitch roof, an open top door will provide an adequate inlet for air. A second inlet in the front wall and an outlet in the back wall are ideal. Boxes with peaked roofs ideally should have a fourth opening in the form of a capped chimney.

Ventilation and respiratory disease

The level of dust and spores in the centre of a box is dependent on the rates of release of the contaminant into the air and on the ventilation rate. Release rates depend on the activity in the stable and on the level of contamination of bedding and hay. Good ventilation combined with the use of bedding and hay with low levels of antigens is important, because improving the ventilation alone may be insufficient.

Heating of stables

- (1) Extra heat may be supplied to stables in the form of electric fans, heat lamps or central heating.
- (2) Provision of heat is particularly important for sick foals. Rugs, leg bandages and even sweaters worn as rugs (sleeves over fore legs) can be employed as additional sources of heat.
- (3) Fire regulations should be observed.

- (4) The potential for patient burns from heat sources should not be overlooked.

Lighting of stables and electrical equipment

- (1) Take great care with water and electricity!
- (2) Be aware that if fires originate from electric heat sources, the first action to take is to turn off the electricity. Know the whereabouts of the mains supply and trip switches, and also of back-up generator supplies if they are available.
- (3) Artificial lighting is desirable, particularly in hospital situations. There should be even lighting in stables.
- (4) Light switches should be outside stables and have waterproof safety covers. All other wiring should not be exposed. Plugs should be placed well away from water supplies and incoming elements.
- (5) Circuit breakers should be employed when using any electrical equipment that potentially could give an electric shock.

Specialised hospital stabling requirements

Provision for cross-tying

Cross-tying may be needed as part of the management of long-bone fractures. This can be achieved by having two rings at eye level placed either side of a corner. It is best to measure the horse's combined neck and head length and calculate how short the ropes need to be to prevent the horse from lying down (even with its head and neck fully stretched out).

Provision for fluid administration (Fig. 1.1)

An overhead system with a hook attached to a rope and pulley is ideal. This allows the hook to be lowered easily so that fluid bags can be changed. The bags then can be raised to a level well above the horse's head and a spiral extension-type giving set can be employed to help the horse to move around.

In non-hospital situations, overhead beams or high structures may be adapted.

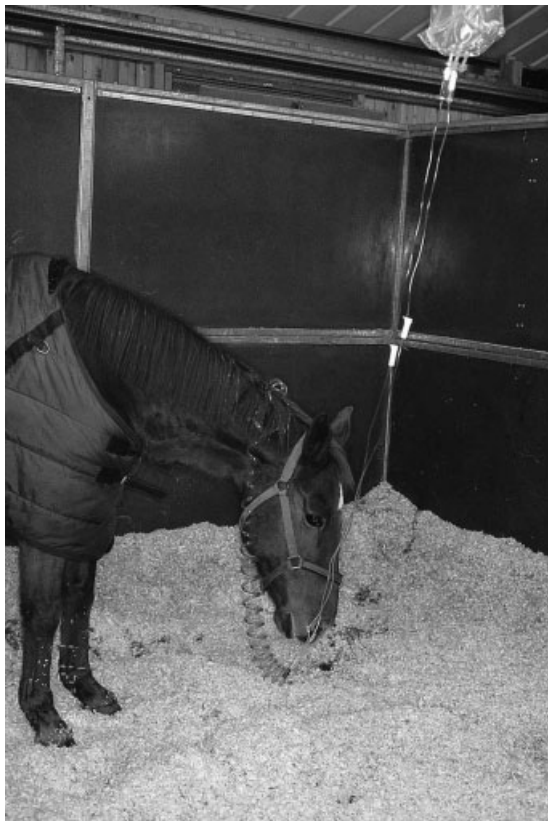


Fig. 1.1 Intensive care facilities: fluid administration.

Yard board for patient details

There should be room to write details for each loose box, such as patient and owner name, treatments and special management requirements.

Stable door details

A removable waterproof hospital card should be in place on each stable door. These also should carry patient details and are particularly useful for individual information such as 'nil by mouth'.

Intensive-care facilities

These are an important part of an equine hospital. They should include:

- (1) Facilities for provision of additional heat and good lighting.

Table 1.1 Indications for isolation

-
- Individual acutely sick animals
 - In-contact animals not showing clinical signs. Particular attention should be paid to animals that may be immunocompromised (e.g. old horses, foals and Cushing's disease cases)
 - Non-contact unaffected animals in an epidemic
 - Animals not showing clinical signs but in the recovery stages of disease (shedders)
 - Quarantine procedures preceding entry into the herd
-

Table 1.2 Some equine infectious diseases in the UK

-
- Equine influenza
 - Equine herpes virus infections
 - Other respiratory virus infections
 - Equine viral arteritis
 - *Streptococcus equi* infections (strangles)
 - Other streptococcal infections (e.g. *Streptococcus pneumoniae*)
 - Infectious enterocolitis (e.g. salmonellosis, clostridial disease, rotavirus, cryptosporidia)
 - Ringworm
-

- (2) Facilities for intravenous fluid administration.
- (3) Colic boxes should have ample deep bedding right up to the door. Alternatively they can be constructed with a rubber floor and walls. Such boxes should have minimal fittings so that the horse does not injure itself if it rolls violently.
- (4) Specialised bedding for sick foals should be available (see Chapter 15). Intensive-care systems for mares and foals should include a separation box, where the foal can be separated to facilitate treatment while the mare can still have some contact.

Isolation facilities

Forward planning is vital to good isolation and the control of infectious disease outbreaks.

Tables 1.1 and 1.2 list the indications for isolation and some infectious diseases.

Principles of isolation

If a serious infectious disease is suspected, then stop all movement on and off the premises immediately. If

it is suspected that an animal has an infectious disease, it must be isolated immediately. *Isolate first and confirm diagnosis later!*

Isolation accommodation

The stable should be used only for isolation purposes and should be cleaned and fully disinfected between patients. The horse should have no contact with others and should be downwind of other stables. Ideally an isolation box should be at least 35m away from other animals, feeding and bedding stores and regular thoroughfares. A completely separate set of feeding, watering, mucking out, grooming and veterinary equipment should be used. These must be thoroughly disinfected between horses. Disinfection methods should be considered in advance. It may be necessary to adjust these according to the pathogen involved. The efficacy of a disinfectant against the organism involved also can be evaluated.

All hospital boxes, but particularly isolation boxes, should have floors of roughened concrete or rubber mats with sealed edges. Walls should be impervious with central floor drains. There should be minimal fittings in the accommodation and these should be easy to disinfect. Ledges and windowsills also should be minimal because they can promote a build-up of debris.

All waste feed and bedding should be burned or disposed of in sealed containers as clinical waste. Carcasses should be burned or disposed of as clinical waste once the appropriate samples have been taken. The drain from isolation accommodation should be away from other animal accommodation and natural watercourses.

Nursing isolation cases

- (1) An isolated horse should have one person ascribed to its nursing and management. There should be minimal contact with the animal and no contact with normal non-isolated animals. In situations where a VN has to deal with isolated horses and others, the isolated animal must be dealt with last.
- (2) Overalls, shoe covers and a head cover should be kept outside the box and used whenever the

Table 1.3 Important questions to ask about an infectious disease

Clinical signs and diagnostic tests:

- What samples need to be collected?
- What is the incubation period?

Transmission of pathogens between animals:

- How does the animal contaminate its environment?
- How important are fomites or other animal vectors?
- Over what distance can aerosol transmission occur?

Survival of pathogen outside the animal:

- How long can the pathogen survive?
- What environmental conditions enhance its survival?
- Does the pathogen produce resistant spores?
- What disinfectants is the pathogen susceptible to?

Protection of susceptible animals:

- Will treatment/vaccination help?

During isolation:

- What is the incubation period and for how long can animals shed the pathogen following recovery?
 - Can asymptomatic carriers be identified (a recognised problem with strangles)?
-

horse is dealt with. Latex gloves also should be worn. These protective items should be disposed of in a clinical waste bin outside the horse's box.

- (3) There should be full facilities for staff to disinfect at entry/exit to the box. A shoe dip also should be provided outside the horse's box.
- (4) Personnel in contact with the isolated horse should thoroughly scrub hands and other exposed skin with a surgical scrub immediately afterwards.
- (5) Fomites (i.e. inanimate objects such as feed buckets) can be a cause of disease transmission. Care should be taken to reduce this risk.

Duration of isolation

Duration of isolation is often difficult to assess and implement, and owner compliance is likely to be very much reduced following cessation of clinical signs. The period of isolation will depend on the disease involved (see Table 1.3).

Bedding and cleaning of stables

Table 1.4 summarises the basic bedding materials available.

Table 1.4 Summary of bedding materials

Type of bedding	Comments
Hay	Generally not suitable because it is edible and expensive
Hemp	Low dust and mould free. Good for horses with COPD. Some horses try to eat it
Paper	Excellent for dust-free environment. May be expensive
Peat moss	Inedible. Dust free. Becoming less readily available. Peat extraction is an ecological issue
Straw: barley straw	Often cheapest but can be poor quality and cause skin irritation. Not suitable for horses with COPD. Any straw can cause impactions if eaten
Straw: oat straw	Often cheaper, but edible. Not suitable for horses with COPD
Straw: treated straw	Treated straw to prevent horses eating it is now available. It is more expensive than traditional straw
Straw: wheat straw	Generally considered the best straw bedding. Light, durable and not usually eaten. Not suitable for horses with COPD
Sawdust	May block drains. If damp, can cause foot problems such as thrush
Wood shavings	Less dusty than sawdust, but can also cause foot problems if damp or if hygiene is poor
Other: rubber, peanut hulls, corncobs, etc.	Ensure a fresh clean supply. Easy to muck out

Cleaning and changing of bedding

Deep litter systems

Deep litter stables are maintained by removing just the droppings on a daily basis. This type of management is not suitable for a hospital situation because of the lack of hygiene.

Complete mucking-out systems

Faeces and urine-soaked litter should be removed daily. Ideally bedding should be removed completely between different horses. Personnel involved in the cleaning of stables should be aware of good personal hygiene and the potential problems of handling urine and faeces. Regular washing of hands and wearing clean protective clothing daily is important.

Disposal of bedding waste

A muck heap should be created in a suitable area, not too close to the stables or other hospital buildings because it may attract flies. Rotting mounds of bedding provide another source of potential pathogens and spores. Regular disposal of bedding, at least every third day, should be arranged.

Bedding for special cases

Chronic obstructive pulmonary disease (COPD)

Horses with COPD suffer from an allergy to fungal spores in hay and straw. If this condition is to be controlled it is vital that the horse is not exposed to materials containing spores. The spore content of feed or bedding depends largely on the moisture content. Straw, hay and grains harvested with high moisture contents mould heavily. It should be noted also that other bedding types that have been allowed to mould will exacerbate COPD. Non-biological beddings do not provide a base medium for fungal growth.

Intensive care

Bedding should be chosen for ease of mucking out, cleaning and disinfection. In some situations, e.g. acute laminitis, the horse should be encouraged to lie down as much as possible.

Orthopaedic cases

When such cases lie down they tend to land heavily on the dependent limb. A deep bed is essential.

Colic cases

Colic patients may be violent and roll repeatedly. Adequate deep bedding is essential, with deep banks to help prevent the horse from getting cast.

Convalescence

Attention to bedding of horses is often neglected in their convalescence after surgery or illness. Recumbent horses, horses with lung compromise after an anaesthetic or pneumonic foals may inhale millions of spores into an already compromised respiratory system.

Cleaning and disinfection

The design and construction of stables should be such that they can be cleaned and disinfected readily and routinely. To minimise the risk of microorganisms becoming established in the fabric of stables, there should be a regular programme of depopulating the accommodation and subjecting it to a thorough disinfection. It is only possible to do this effectively if all internal surfaces have impervious and easily disinfectable concrete walls and floors. The materials used must withstand pressure cleaners, strong detergents and a full range of disinfectants.

Stable hygiene is of utmost importance in the prevention of infectious and contagious disease (see Chapter 14).

Stable yards

Daily mucking out is important and stables should be kept clean and dry with plenty of fresh bedding. As far as possible, horses should keep the same stables. A routine of removing all the bedding and thorough disinfection should be employed on a regular 3–6 monthly basis.

Equine hospitals

As with any stable yard, hygiene is vital. Hospitals should be organised so that stables are grouped according to the following categories. Notes on cleaning and hygiene are made for each category:

- (1) Routine hospital cases: stables should be washed and cleaned between cases, depending on individual hospital policy.
- (2) Intensive-care hospital cases: particular care should be taken with the routine cleaning of intensive care boxes. It is important to observe the amount of faeces and urine produced.
- (3) Isolation boxes: removal of all bedding (and ideally subsequent burning) should be carried out. Thorough disinfection is essential. Ideally the stable should be left vacant for a period of time before being re-used. This often depends on the microorganism implicated in the contagious disease, because different microorganisms can survive for differing lengths of time in the environment, even after disinfection.
- (4) Quarantine: as with isolation boxes, quarantine boxes should be disinfected thoroughly between occupants. It would be advisable when working in such situations to obtain specific information (from the State Veterinary Service) about where the horse has come from and the nature of potential diseases it may carry.

Disinfectants and antiseptics

- *Disinfection* is the removal or destruction of pathogenic microorganisms, although not necessarily of bacterial spores. The number of 'vegetative' microorganisms thereby is reduced to a level that is not harmful to health. Disinfection can be achieved using chemical solutions, by heat treatment or by physical removal.
- A *disinfectant* is an agent usually applied to inanimate objects to destroy microorganisms. Many disinfectants are harmful to living tissue. It is therefore important that anyone using disinfectants be aware of this and take the appropriate precautions as advised by manufacturers. It is essential always to read the labels of disinfectants used and adhere strictly to safety instructions.
- *Antiseptics* destroy microorganisms, but not bacterial spores, on living tissue. They prevent the growth of microorganisms and may be applied safely to living tissue.
- *Sterilisation* is the destruction of microorganisms and spores.

Table 1.5 Disinfectants and their properties

Active ingredients (product name)	Inactivated by organic material (Yes / No)	Effective against rotavirus	Comments
Chlorine compounds (bleaches)	Yes	No	
Quarternary ammonium compounds	Yes	No	
Phenolic compounds	No	Yes	Generally not utilised due to toxic and irritant properties
Iodophors	No	Yes	Usually utilised more for handwashing during outbreaks
Halogenated tertiary amines (e.g. Trigene)	No	Yes	Non-toxic and biodegradable. Commonly utilised
Halogenated peroxides (e.g. Virkon)	Yes	Yes	Commonly utilised. Has fungicidal properties

- *Contamination* is the presence of microorganisms in tissues, which may or may not result in infection.

Principles of disinfection

- (1) It is important to establish whether a disinfectant is bactericidal (actually destroys the organisms) or bacteriostatic (stops bacterial growth). Bactericidal chemicals with activity against spores are preferable but such substances are more likely to be harmful to the operator.
- (2) Chemicals that are not inactivated in the presence of organic material (such as pus, blood and faeces) should be chosen. Removal of gross contamination is paramount and pressure hoses can be very useful for this.
- (3) Selection of a chemical that is effective against the pathogens that are most difficult to destroy is appropriate.

Susceptibility of microorganisms

- (1) Gram-positive bacteria are destroyed most easily by disinfectants. Streptococcal organisms are susceptible to drying and heat but *Rhodococcus equi* is resistant to drying and heat under natural conditions.
- (2) Gram-negative bacteria, acid-fast bacteria and bacterial spores are increasingly resistant.
- (3) Rotavirus and cryptosporidia are most difficult to destroy. Rotavirus commonly causes diarrhoea in foals, from newborns up to 5 months of

age. It is a heat-resistant virus that is known to survive in the environment for up to 9 months. Choosing a disinfectant that is effective against rotavirus also will control most other commonly encountered pathogens.

- (4) Cryptosporidia are a special case and only a minimum of 18h of fumigation of buildings with formaldehyde or ammonia will disinfect adequately. However, formaldehyde is highly toxic and has noxious fumes, making it impractical to use routinely in stable environments. Fortunately their role in neonatal diarrhoea is questionable because they can be found in both normal and sick foals.

Practical disinfection

Table 1.5 outlines the common disinfectants and their properties. Practically, it is best for a hospital to have one main type of disinfectant to be used for most circumstances. Halogenated peroxides and tertiary amines are highly effective against all bacteria and most viruses, including rotavirus.

Loading and unloading of horses from transporters

Transport by road

Horses may be transported by road in trailers or horse boxes, which come in varying forms and may have side and/or end-unloading facilities.

Many horses are accustomed to travelling and load and unload easily.

However some horses can be very difficult. Common problems include:

- Unfamiliarity with vehicle or trailer
- Ramp too steep or poorly positioned
- Previous bad experience
- Compartment size too narrow (e.g. in end-loader trailers)
- Lack of suitable training
- Reluctance to travel alone

General points for loading and transporting

The trailer should be in a safe loading area with a closed gate between the loading area and a road. Many horses load more readily when the vehicle and trailer have been positioned with one side along a solid high wall. Backing the trailer into a barn could be considered for horses that readily run out of either side of the ramp. Many horses will enter a transporter more readily if a second ramp is open so as to create the impression of a thoroughfare.

Ideally all horses should be loaded in a bridle or with a Chifney bit. Where two or more horses are to be transported, load the easiest and more sensible horses first. Many horses that are nervous and reluctant to load will do so much more readily with a companion already in the transporter.

Trailers and horseboxes should be safe and road-worthy. Regular safety checks and compliance with regulations, as with any vehicle, are important. This includes safety within the transporter, such as ensuring a strong enough floor for any horse travelling.

Trailers

The following points should be considered:

- The vehicle always should be attached to the trailer before loading the animals.
- When loading the first horse it may be easier to move the central partition across to give the impression of a larger compartment.
- It is illegal for persons to travel in the back of trailers.



Fig. 1.2 A loading ramp. Difficult horses often will load more readily using a loading ramp.

Loading ramps

Loading ramps (Fig. 1.2) decrease the gradient of the transporter ramp in order to make the entrance to the vehicle seem more inviting for the horse. A purpose-built ramp should have room for boxes with both front and side doors to manoeuvre. There should be solid walls either side of the ramp to 'funnel' the horse in. It is usually necessary to have a lower ramp for trailers and a higher one for lorries.

Unloading

As with loading, all safety precautions should be taken. Horses often exit from vehicles with unexpected speed. A bridle or Chifney bit (see Fig. 1.5, p. 13) should be used, particularly where there is direct access to a road.

Problem horses

There are many tricks to getting problem horses to load. Generally owners should be encouraged to practise loading problem horses so that they learn not to fear transporters, e.g. walking horses through a front- and end-unload vehicle daily, and even feeding in the trailer can be excellent methods of getting animals used to vehicles. Shy loaders should be rewarded with food when they enter the vehicle.

Clothing for transport

Opinion as to how much protective clothing should

be worn by the horse during transport varies greatly. Certainly some form of lower limb protection is advisable. Horses that violently raise their heads or rear may benefit from a poll guard. Tail bandages and tail guards also may be useful.

Transport of sick or injured horses

Dehydration

Transport of even a healthy animal incurs a certain amount of stress, even if the animal looks completely calm and healthy. It is always important to advise owners to provide adequate water, and to offer water during the journey if it is longer than 1 h (particularly in the summer).

Respiratory problems

Horses with respiratory problems may experience sudden flare-ups during transport, particularly on long journeys where conditions are hot and dusty. Normal management factors, such as reduced exposure to hay and straw and adequate ventilation, should be considered. Acute pleuropneumonia can occur when horses travel for very long distances (e.g. across North America). This condition has been linked to the fact that horses are tied in a head-upright position for long periods of time and are thought to be more prone to aspiration of pharyngeal contents.

Horses that have been sedated should be fully recovered before travel. Not only does a sedative make an animal more unstable on its legs, but aspiration of food and choke is also possible. It is always unwise to transport a horse with a hay net after sedation.

Choke

Horses with choke travelling to a clinic should be transported without any food.

Colic

Horses travelling to a clinic for colic investigation may be extremely restless or violent. Such animals should have no food offered to them. Restraint of horses with colic can be very difficult.

Fractured limbs

With any suspected or diagnosed fracture, a vet

should apply proper support and splinting before moving the horse, because travel can exacerbate the injury. Great care should be taken when loading, transporting and unloading animals with limb splints.

Equine ambulances

Specialist trailers and lorries are now available for the transport of animals requiring treatment. Such vehicles are fitted with accessories such as winches, belly support straps and drag mats.

Basic training and management

Training

Training a horse so that it learns to live with humans should begin from birth. From a very early stage a foal should be used to people being in its environment and similarly used to human-associated noises. There are no definitive rules for training but continuity and reward are very important. Always remember the nature of the horse and its natural behaviour. Aim to be gentle and not frighten the young horse, so as to produce a horse that is calm and confident to ride and handle. Horses, like people, differ in their natural ability and in their capacity for learning. In addition, different horses are required for different purposes, e.g. the early backing and racing of juvenile thoroughbreds is a particularly highly skilled area.

Early handling

The foal has acute hearing, good eyesight and is sensitive to touch. If properly handled, a foal quickly will become accustomed to people and will learn to trust them. The foal should be touched and spoken to in the first few days of life. As soon as the foal is used to being touched and approached it should be fitted with its first headcollar, which is called a foal slip. Gentle handling of the head and ears in the early stages is important in preventing a headshy horse later in life. Foals often resent being led by a halter. A recently developed device is a figure-of-eight halter, which fits over the whole body of the foal and guides its body rather than just its head.

Leading

Ideally a led animal should walk forward freely. An unwilling foal should never be pulled or it will learn to resist by running back or rearing. Leading the foal while it is following the mare is a good way to teach it, accompanied by the use of quiet but firm verbal aids and a hand around the hind quarters to push and guide steadily.

Traditionally horses are led from the left (i.e. the 'near' side), yet they should be trained to accept approaches from both sides. For example, when leading on the road the handler always should be between the horse and the traffic. The lead rope should be held near the horse's head, with the free end in the other hand. The rope should never be wound around the hand.

Release and catching

If a foal is being properly handled it should not be difficult to catch. Patience and positive rewards should be encouraged when releasing and catching animals.

Lungeing and loose schooling

Lungeing (Fig. 1.3) and loose schooling may be used in the early stages of training, but only by those with experience. This is hard work for a horse and should be used with care and in moderation in young horses with growing joints.

Backing

Before backing a horse it is a good idea to be aware of the animal's natural state and behaviour. A horse has a blind spot behind him and a natural fear of anything landing on its back. In addition, the horse has to get used to an increased weight. Gradual introduction of increasing weights on the saddle should precede the first attempt of a rider in the saddle. Many trainers make use of a dummy jockey.

Aids to training and restraint

For most procedures around the stable yard the horse can be restrained by a halter or headcollar. A foal slip, which will break easily, is preferable for young ani-



Fig. 1.3 Lungeing with a lunge cavesson and bridle for control. Note the protective brushing boots on the horse and the gloves and hat worn by the handler.

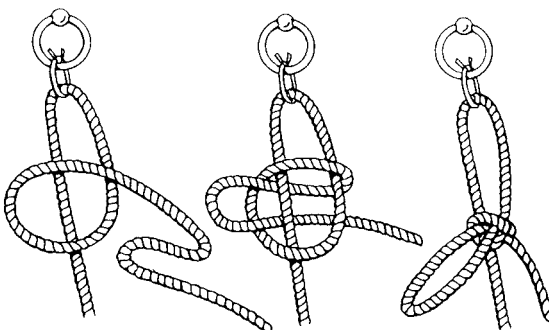


Fig. 1.4 Tying a quick-release knot.

mals. All horses should be trained to stand quietly when tied up. This should be achieved at an early age. A quick-release knot (Fig. 1.4) always should be used, and ideally the animal should be tied to a sturdy ring or post via a piece of string that will break if the horse pulls back violently.

Additional control

For additional control a normal bridle or in-hand bridle may be used. A Chifney or anti-rearing bridle is a very useful device that is fitted with three rings—two for the cheek pieces and one for the lead rein—and has a shallow inverted-port mouthpiece (Fig. 1.5). In animals that are too young to wear a bit, a lunge cavesson with lunge rein may provide better control. The lead rein or lunge line attaches to the front of the noseband on a lunge cavesson. A special halter de-

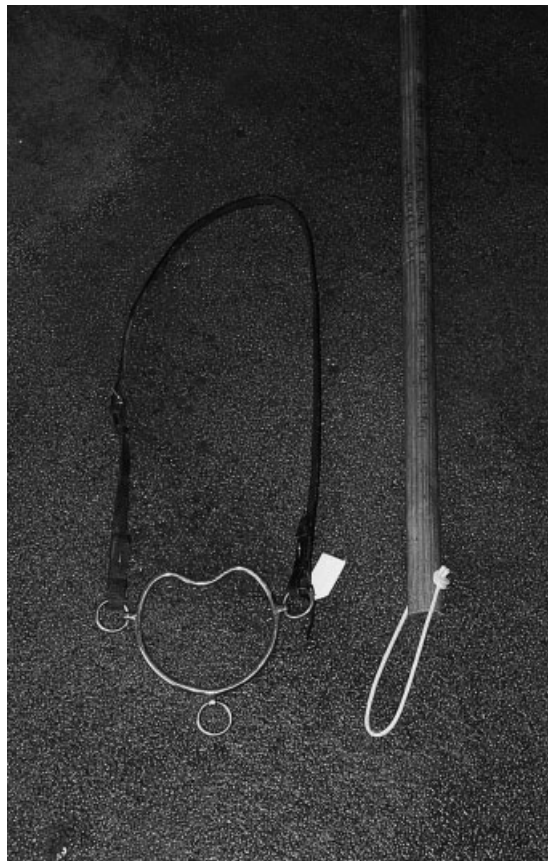


Fig. 1.5 Aids to restraint. The twitch and Chifney bit are two devices commonly used for restraint.

veloped by Monty Roberts can be used to discourage a rearing horse, without using severe forces of bits in the mouth. It puts pressure on the poll and the nose. This device can be very useful for loading difficult horses.

Additional restraints

Twitch

A traditional twitch (Fig. 1.5) is made of a short pole 50–70 cm in length, with a loop of rope 6–7 mm thick at the end. The loop, which should be 40–50 cm long, is twisted around the horse's upper lip. The twitch works partially by causing pain and distracting the horse's attention, so should be used only when *absolutely* necessary. It also causes the release of natural

endorphins, which have a narcotic effect. It can be an extremely useful method of restraint, but modern sedatives are often a more humane solution. Other methods of restraint include:

- Skin twitch: taking a firm grip of a fold of neck skin can distract some horses.
- Ear twitch: similar to a skin twitch; holding and gently twisting the ear may control some horses, particularly youngsters.
- Raising a foreleg: this can be useful if you are confident that you can keep the leg up when the horse tries to move.
- Stocks: stocks limit horse movement, but must be designed to maximise horse and human safety.

Approaching an unfamiliar horse

When approaching a horse, particularly a nervous animal, always speak to let it know your presence. Approach from the front and slightly to the side, and walk towards the shoulder. Handle the horse first on the lower neck or shoulder, and then put a lead rope around its neck. At this stage many animals will consider themselves caught. Difficult individuals should wear a headcollar when turned out or even in the stable until they learn to be caught submissively. Headcollars with rubber pieces that break if the headcollar snags on something are ideal.

Using food to tempt horses can be useful, although they should not come to expect it always. Placing the noseband of a headcollar around the inside of a bucket may help when catching a difficult animal. Speed and technique are always important in such situations.

The horse's natural behaviour

Most horses behave better if handled with confidence, firmness and kindness. Only deliberate bad behaviour should incur reprimand, and this should be immediate.

When persuading horses to do something unfamiliar or frightening, their primitive instincts for food and companionship can be utilised. Much work has been carried out recently in new methods of training the horse (e.g. Monty Robert's work) that

involve gaining the horse's trust by using common sense and thinking in terms of a horse as a wild pack animal. Kicking, biting, bucking and running away were methods of survival in primitive horses. These instincts remain but can be modified by training.

Signs of certain types of behaviour

When horses flatten their ears, bare their teeth and lunge towards other animals or people, this is very often a sign of aggression rather than fear. If afraid, a horse may flatten its ears, yet turn away.

Remember that fear can manifest as aggression. In certain clinical conditions a horse's behaviour changes, e.g. mares with ovarian granulosa cell tumours may show particularly aggressive behaviour towards people and other horses.

Sexual behaviour

Stallions may demonstrate inter-male aggression, a form of competitive aggression. Inter-female aggression is less commonly encountered.

Some mares may show undesirable behavioural changes when they are in season. It is possible to manage these behavioural changes pharmacologically. Mares can be extremely protective and possessive over their foals. Care must be taken with even the most trustworthy mares. Conversely, some mares show inadequate maternal behaviour and may even reject their foal.

Horses in groups form relationships where there is dominance and a form of 'pecking order'. Many people prefer to keep field-kept mares and geldings separately because traditionally male-female aggression is thought to be a problem, although some geldings and mares can be managed together safely. Horses, particularly young stock, also play together. This may be observed particularly in young entire males.

Each horse is an individual. There are no set rules, and specific types of behaviour should never be taken for granted.

Vices, stereotypies and redirected behaviour

In the past certain types of abnormal behaviour were



Fig. 1.6 Stereotypical behaviour: horse cribbing on stable door.

known as vices. We now know that many 'vices' are the horses attempt to cope with a stressful environment. Their significance to equine health is widely disputed, e.g. many link crib biting with colic, whereas others refute this.

Stereotypies are invariant and repetitive behaviour patterns that seemingly have no function. Horses are naturally free-ranging social-grazing herbivores. In stables, horses are provided with food, water and shelter, but their choice of food, social interactions and movement are limited. It is under these conditions that undesirable stereotypical behaviours develop. Locomotor stereotypies, such as weaving and box walking, may be related to lack of exercise. Oral stereotypies, such as wind sucking and cribbing (Fig. 1.6), have been associated with feeds of high digestibility but little dietary fibre. Giving the horse greater time in paddocks with *ad libitum* forage and social contact may be a successful means of reducing the frequency of crib biting.

Redirected behaviour occurs when a certain type of motivational behaviour is prevented. The horse will perform another type of behaviour to replace that lost. Weaving bars, for example, may reduce the over-the-door weaving but horses can continue to weave out of sight in the stable. Self-mutilation is a compulsive behaviour that is seen occasionally, particularly in stallions. Castration often resolves this problem and it therefore may represent a redirected behaviour motivated by sexual frustration. Stallions also tend to show a higher rate of cribbing and weaving compared with mares and geldings.

Certain behaviours such as pawing, digging or door kicking may be reinforced by attention. Many horses carry out these 'vices' prior to feeding, and are subsequently 'rewarded' for the abnormal behaviour. Stereotypical and redirected behaviours do not consistently cause direct harm to the horse. They are considered undesirable and may represent a welfare problem. It is important to understand the motivation behind these abnormal behaviours, rather than resorting immediately to drugs or surgical means to prevent them.

Grooming methods and equipment

Grooming equipment

Grooming is carried out in order to promote good health of the coat and skin, as well as for aesthetic reasons. The key items include brushes, curry combs and hoof-care equipment.

Curry combs

Plastic and rubber curry combs are used to remove dried mud, sweat and dead hair. Metal curry combs are used for cleaning the body brush during grooming.

Brushes

Dandy brushes are designed to remove heavy dirt from a horse's coat. Body brushes are softer and are used on the body, mane and tail for the removal of fine dust, scurf and grease from the coat. This is best carried out once removal of the gross debris has been completed.

Whisks, sponges and stable rubbers

Whisks and stable rubbers are traditionally used after a full and thorough groom (known as 'strapping') in order to massage and tone underlying muscles and give a good finish and shine to the coat. Whisks are made from hay or soft straw fashioned into a rope.

Other grooming equipment

Mane and tail combs, scissors and sweat scrapers are just some of the many additional items that may be found in a grooming kit.

Hygiene

All items should be cleaned and disinfected regularly. Grooming kit should be confined to one horse. Cleaning of brushes after each grooming can be a useful diagnostic tool for skin diseases. For example, examining brushings either with the naked eye or under the microscope can reveal mites such as *Trombicula autumnalis* (harvest mites) and lice.

Clipping horses

Horses are clipped for various management and veterinary reasons.

Management reasons for clipping

- To enable horses to work hard without excess sweating.
- To reduce grooming.
- It is traditional not to clip after January, to allow the subsequent summer coat to develop properly. It is also advisable not to clip horses' lower limbs because this removes the waterproofing of the hair. However, many horses are fully clipped and suffer no ills provided that the legs are adequately cleaned and dried as necessary.

Veterinary-related reasons for clipping

- Investigation of trauma sites and wounds.
- When cleaning wounds prior to repair. This may not be possible in some cases, e.g. wounds along the eyelids.
- Preparation of a site for surgery or aseptic techniques, e.g. arthrocentesis.
- Cushing's cases often grow a thick curly coat, which they fail to lose in summer. They may be managed with full body clips during the summer months.
- Skin diseases: rain scald and mud fever develop in damp microclimates, such as that afforded by long hair. One of the steps to control these skin conditions is trimming the thick coat.

Types of clippers

Clippers may be battery or mains operated. Hand-held cordless rechargeable clippers are invaluable in hospital situations. Mains-operated clippers should

have a safety-approved insulating cord. Clipping using such equipment should not be undertaken on wet floors and the horse must be prevented from standing on the electrical flex. Ideally, shod horses should be clipped on rubber mats and a circuit breaker should be used.

General points

The coat must be clean and dry for clipping. Efficient use of clippers is dependent on clean, sharp, cool blades used at the correct tension. Poorly cared for equipment is noisy, pulls the hair and may burn the animal. Clipper rashes or wounds can occur with poor clipping. Periodically clippers need to be lubricated. Clippers can be oiled and left to cool during use if they get very hot. This is particularly relevant where horses are being clipped all over for management reasons. After use, machines should be stripped, cleaned and oiled before storage.

Difficult animals

Some horses can be dangerous and difficult to clip. The horse should be taught that the touch and sound of the clippers are not something to fear. Allowing the horse to see and smell the clippers turned off can be useful. The clippers then can be run over the horse without being activated. Getting a horse used to the sound of the clippers can be more difficult and may take several training sessions. It should be considered that horses are genuinely afraid and punishment may exacerbate this. Terminating clipping due to bad behaviour reinforces this and future attempts can be even worse. Counter-conditioning or behaviour modification uses the principle of associating food and pleasurable activity with the noise of the clippers. This can be achieved using a tape recording of clippers during feeding.

Additional restraint in the form of a bridle or Chifney bit is often advisable for difficult horses during clipping and other veterinary procedures. Some horses are completely intractable to clipping and sedation is required.

Preparation of sites for ultrasound examination

Preparation is particularly important where ultra-

sound examination involves the use of a high-frequency probe (such as 7.5MHz), as used in tendon scanning. Although asepsis is not required, thorough cleaning of the area as for surgical preparation is recommended. This degreases the skin, so facilitating better contact between the probe and the skin. Even better contact is afforded if the gel is allowed to soak in for at least 10 min before scanning.

Bathing horses

Non-medical reasons include bathing for the removal of sweat, dirt and scurf, and for aesthetic reasons. Horse shampoos can wash away the natural oils of the coat and should not be over-used.

When horses suffer from various parasitic infections and skin diseases, bathing with medical preparations may be necessary. Medical reasons for bathing horses include:

- Mud fever and rain scald
- Ringworm
- Lice infestation (pediculosis)

For guidance and information, see Chapters 9 and 14. Other medicated shampoos or washes are sometimes prescribed by the vet for specific skin conditions.

Basic foot care

Daily foot care

Daily care of the feet is vital. This involves picking out the horse's feet and cleaning away debris with a hoof pick and stiff brush. This should be performed at least once daily, plus each time the horse returns from work. Stable hygiene is also a vital part of foot care. Conditions such as thrush and white line disease occur in dirty stabling (see equine lameness, Chapter 16). It should be noted that youngsters and unshod horses turned away to grass still require regular foot care and attention.

How frequently a horse is shod depends on the type of work it is doing, how fast its feet grow and are worn, and the need for special types of remedial shoes.

Hoof oil

This has traditionally been used to form an impermeable barrier to regulate water loss from the hoof. However, in well kept healthy hooves the periople serves naturally to protect the hoof from dehydration. Good stable hygiene is also a vital part of foot care.

Removing a shoe

A shoe is removed by:

- (1) Raising the clenches, by placing the blade of a buffer under each clench and giving it a sharp blow with the shoeing hammer.
- (2) By using the farriers pinchers (also referred to as pulloffs), the inside heel of the shoe is eased, followed by the outside. This is continued alternately along each branch until the shoe is loose.
- (3) At this point the shoe can be grasped at the toe and pulled backwards across the foot and off. Most pinchers have knobs at the ends so that they are less likely to be confused with nippers.

Alternatively a nail puller is an effective tool to remove each nail individually after raising the clenches (Fig. 1.7). It is important that nails are safely disposed of immediately, to reduce the risk of the horse treading on them.

Chaps or a farriers apron are very useful for protection while removing shoes and manipulating feet.



Fig. 1.7 Nail pullers to facilitate the removal of a shoe.

Farriery tools

Hoof testers

Hoof testers are useful in identifying generalised or focal pain in the foot. Generally hoof testers are used prior to hoof knives when an abscess is suspected, because it is important to localise sensitivity within the foot.

Hoof knives

These come in many designs, but the basic style is a curved handle with a blade that is gently curved throughout its body, with a sharp hook at the end. Right- and left-handed versions are available. Hoof knives are used to remove redundant sole from the bottom of the horse's foot and to trim the frog. These knives are used also to search the foot for abscesses.

Rasp

The rasp is a long, thin rectangular piece of metal that has sets of metal teeth on both sides as well as at the edges. On one side the teeth are much longer and angle towards the handle. This side is used for coarse work, such as levelling the foot after trimming. The other side of the rasp usually has a cross-hatched pattern that is used for finishing the foot or smoothing off any rough areas of metal. This side of the rasp can be used to remove nail clenches prior to pulling shoes. This can be carried out with the foot supported on the operator's leg.

Nippers

Nippers are used for removing large portions of outer hoof wall, most commonly when trimming the foot. The handles are opened and closed while perpendicular to the foot in order to maintain a flat weight-bearing surface. They should never be used to remove shoes because this may damage the blades.

Cleaning and preparation of the foot

Extensive cleaning and preparation is often required for radiographic investigation of the foot. For a full examination, the shoes must be removed (see Chapter 17). Similar cleaning of the foot (without the packing) is often required when horses are taken into the operating theatre, in order to reduce contamination.

Care and safety of farriery equipment

Farriery equipment should be cleaned regularly and stored carefully. Knives and nippers should be kept as sharp as possible.

Clothing and rugging of horses

Rugs

Rugs can be important fomites in the transmission of contagious diseases, particularly ringworm. Confining rugs to one individual is a sensible precaution in controlling infection.

General fitting and care of rugs

It is very important to use rugs that fit a horse properly, particularly if they are to be worn for long periods of time. Common areas to develop rubs are over the shoulders, pectorals and withers. Ill-fitting rugs are also more likely to slip if the horse rolls or lies down. This is an important consideration with hospitalisation of colicking horses. Some horses benefit from the use of anti-cast rollers. These utilise a large stiff loop over the withers that prevents the horse from rolling right over. Commonly used rugs include:

- New Zealand rugs: these are made of a waterproof outer layer with a wool, quilt or cotton lining. They are primarily used for horses that are field kept or turned out for part of the day during the autumn and winter months. Clipped horses usually need to wear a New Zealand rug when turned out in the cold or rain. Care should be taken that rugs are checked and refitted daily and are not rubbing.
- Stable rugs: traditionally clipped stabled horses wore a 'jute' rug, made of natural material such as jute or hemp. These are half- or fully lined with wool, and warmth can be augmented with several layers of underblanket. Today there is also a vast array of man-made rugs. Many of these are of excellent quality, being rot-proof, readily washable, durable and warm. Modern rugs also tend to have enough built-in straps to prevent movement of the rug. This precludes the use of rollers and surcingle, which can be poorly fitting and cause rubs.

Traditional natural-fibre rugs and blankets will still suffice if they are properly managed.

- Day rugs: a traditional day rug is made of wool and is used to replace the night rug of a stabled horse after exercise. However, such rugs are increasingly synthetic and of varying thickness and design. Day rugs are now often used for travelling and at shows and events.
- Summer sheets/fly sheets: these replace day rugs in warm weather. They are used to protect the horse from fly irritation and to prevent stable stains. However, horses that really suffer from fly irritation, to the extent that they are allergic to fly bites (fly bite hypersensitivity or sweet itch), require more aggressive anti-fly treatment. Special rugs are now available for sweet itch sufferers. These include extensions up the neck and around the proximal limbs.
- Anti-sweat rugs: the rationale behind anti-sweat rugs is that they create many air pockets and provide an insulating layer in which there is sufficient air movement for evaporation. In cold weather it is wise to use another rug over the top of the sweat rug to prevent over-rapid cooling. Straw or hay can be used underneath the sweat rug to increase the insulative effect. Modern rugs that 'wick' sweat away are available.

Bandages and boots

Bandages

Bandages should be applied with even pressure, so that they do not cross or rub bony prominences. The frequency with which a bandage should be changed depends on the type of bandage and its purpose. A bandaged horse should be checked daily for rubs and sores.

Tail bandages

Any veterinary examination involving the perineal region is greatly facilitated by the horse wearing a tail bandage. This is particularly important during gynaecological work. Such bandages are also useful during hindlimb lameness investigation or evaluation of traumatic wounds. When a site has been aseptically prepared in the caudal region of the body, it is

vital that the site is not contaminated as the horse swishes its tail. Full tail bandages for horses with diarrhoea are also very useful in reducing contamination and keeping the perineal area clean. A rectal sleeve over the bandage is also very useful (Fig. 1.8). Full tail bandages should be applied also before a horse enters the operating theatre, in order to reduce contamination.

Stable and travelling bandages

Almost all bandages require some form of conforming material between them and the leg to ensure even pressure distribution. These bandages provide protection against trauma and support to the limb. Traditionally bandaging is used after strenuous exercise to reduce synovial effusions such as windgalls (digital sheath effusions). Stable bandages are frequently made of non-elastic material.

In veterinary situations stable bandages have some specific roles, e.g. a serious limb injury on one leg means that the contralateral (opposite) leg will, effectively, be bearing extra weight, so firm stable bandages for such limbs are extremely important to provide additional support.

Exercise bandages

Exercise bandages are used primarily to protect the digital flexor tendons from injuries such as over-reaches and trauma. They are not as impact resistant as boots, but are conforming, which is important for horses in fast work.

Boots

Brushing boots

Brushing occurs when the supporting limb is struck by its advancing partner. Modern brushing boots are usually made of synthetic materials, and are durable and easy to clean. It is important that boots are cleaned after each use, because dried mud and sweat can create sores and encourage skin disease.

Over-reach boots

An *over-reach* injury is produced by the advancing hindfoot on the back of the forelimb of the same side. Such injuries typically occur at the bulbs of the heel and are caused by the inside toe of the shoe if the



Fig. 1.8 Tail bandages and plastic bags or rectal sleeves can be useful when nursing patients with diarrhoea.

horse is moving at speed. Over-reach boots fit around the pasterns and cover the coronary bands and bulbs of the heel. Over-reach injuries sustained above the fetlock are known as *speedy cut* injuries. Speedy cutting boots are available, and these afford protection to the flexor tendons above the fetlock.

Serving or covering boots

Serving boots are fitted to mares' hindfeet to protect the stallion from the impact of kicks. They are usually made of felt or soft leather.

Other types of boot

A plethora of boots are available for protection of different parts of the horse. These include:

- Heel boots
- Tendon boots

- Fetlock boots
- Fetlock rings
- Coronet boots
- Knee boots
- Hock boots.

Travelling boots are sometimes used in place of stable bandages during transport. Some types of travelling boots have extensions for protection of the knees and hocks. Sausage boots are thick padded rings of leather fitted around the pasterns to prevent the heel of the shoe from traumatising the elbow when the horse is lying down, thus predisposing to a 'capped elbow'.

Tack and harness equipment

A saddle and bridle is the basic tack required for riding. Proper fitting and regular care and inspection is critical. All tack and harness equipment has the potential to cause serious rubs and sores. It is critical that it is fitted properly and maintained carefully. There are many specialist books on this (see the further reading list).

Marking methods

Identifying an individual horse relies on noting their individual natural features (i.e. markings) or using an acquired method of marking, e.g. microchipping. Different markings forms (Fig. 1.9) may vary slightly in their horse outlines and also in the information required. However, in general the following apply:

- Any white marking on the horse must be shown in red and any other marks must be shown in black on the form.
- The use of ballpoint pens is recommended because this ensures good results if the document is to be photocopied.
- The narrative and the completed diagram must agree.

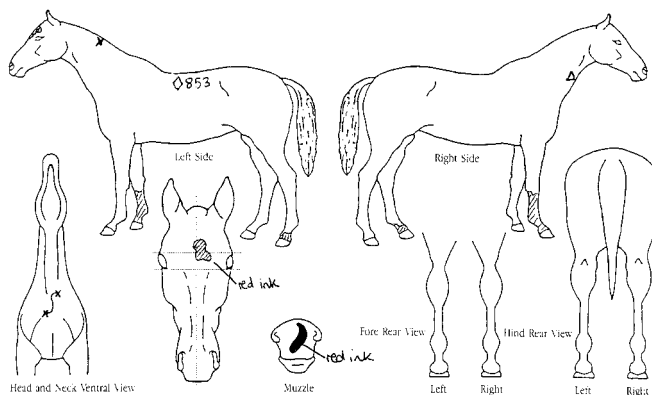
Further information is available in the booklet entitled *Colours and Markings of Horses*, published by the RCVS. Several important parts of the identification should be noted:

- (1) Whorls occur where there is a change in direction of flow of the hair, usually radiating from a single point (see Fig. 1.11, p. 23) Whorls must be indicated by an 'X' in the case of simple or tufted whorls. Linear and feathered whorls are indicated by placing an 'X' where the whorl starts and a line from this to indicate the direction and extent of the whorl.
- (2) White markings are outlined in red and hatched in with red diagonal lines. A few white hairs may be indicated by a few short lines in red. White markings from surgery, freeze branding, etc. should be indicated as for other white markings.
- (3) Bordered markings should be indicated by using a double line.
- (4) Spots: a white spot must be indicated as for a white marking. A spot within a white marking should be outlined in black and left blank. Extensive spots should be noted only in the description.
- (5) Flesh marks. These should be outlined and shaded completely in red. Any spots on the mark should be outlined in black and left unshaded.
- (6) The prophets thumb mark. This is a natural dimple in the muscle, usually on the neck, which is shown on the diagram by a black triangle.
- (7) Permanent scars should be arrowed.
- (8) Others: hairs of a different colour on parts of the coat should be described with accuracy and indicated with a few diagonal lines; if the horse is docked or the ears nicked, this should be stated in the description; wall eyes (lack of pigment in the iris, causing the eye to be blue/grey in colour) should be noted; The Jockey Club recently has required that chestnuts (horny deposits on insides of limbs) are marked on the forms for whole coloured or grey animals.

Colours

There are four basic coat colours in horses. These are black, brown, bay and chestnut, but deciding the true colour, particularly of a foal, can be difficult. It is suggested that a decision can be based on the colour of the hairs of the muzzle.

Freeze mark/Brand ◇853	Signalment key																			
---------------------------	-------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



Name of animal			No.	
Colour	Sex	Date of Birth	Approx. Adult Height	
Head White star to left of midline. Flesh mark on muzzle				
Neck Left hand side mid third crest whorl. Ventral neck sinuous whorl. Right hand side papular thymic mark				
LEGS	LF			
	RF	White from level of carpus down to hoof		
	LH	White from fetlock down to hoof		
	RH			
Body Freeze brand caudal to whitiness left hand side			V.S. Stamp and signature:	
Place and Date				

Identification procedure: The above identification must be completed by a Veterinary Surgeon only. The recommended procedure for identification is described in the F.E.I. booklet 'Identification of Horses'. The diagram and written description must agree and must be sufficiently detailed to ensure the positive identification of the animal in future. White markings must be shown in red and the written description completed using black ink in block capitals or typescript. If there are no markings, this fact must be stated in the written description. All head and neck whorls should be marked ("X") and described in detail. Other whorls should be similarly recorded in greys and in animals lacking sufficient other distinguishing marks. Acquired marks (" ") and other distinguishing marks, e.g. prophetic's thumb mark ("Δ"), wall eye, etc., should always be noted. Age: In the absence of documentary evidence of age, animals older than 8 years may be described as "aged". Please leave blank: 'signalment key' top right hand box and 'No'.

Fig. 1.9 An example of a markings form. A basic markings form of the left and right sides of the horse, a front view of the head, a ventral view of the muzzle and underside of the neck and rear views of the fore- and hindlimbs.

Black

The skin, mane, tail and body hair are black. No other colour is present except that white markings on the face and limbs are permitted.

Brown

The skin is dark and the coat hairs are a mixture of black and chocolate. The limbs, mane and tail are brown or black.

Bay

The coat is dark red to yellowish brown in colour, whereas the mane, tail and lower limbs are

black. Black on the limbs is referred to as black points.

Chestnut

A chestnut horse has yellow hairs in its coat. The proportion of yellow hair varies to give a coat that ranges in colour from reddish brown (liver chestnut) to light yellowish brown.

Palamino

A palamino could be considered a type of chestnut. The body hairs are a bright golden yellow, whereas the mane and tail are flaxen or white.

Dun

Dun colours are the result of dilution of the basic coat colour, whereas the mane and tail remain dark. For example, a yellow dun has a dark skin with a black or chocolate mane and tail. A withers stripe, list (or dorsal stripe) and zebra markings are often present in duns.

Roan

A roan horse has a body colour that consists of a mixture of white and coloured hairs in approximately equal quantities. The solid colour tends to predominate on the head and the limbs, and the colour of the roan is determined from this. A roan differs from a grey horse, which has an uneven mixture of white and coloured hairs and where the percentage of white increases with age.

Grey

The coat of a grey horse is an uneven mixture of white and dark coloured hairs with the skin darkly pigmented. As the animal ages, the coat becomes whiter. Foals are rarely born grey but become grey when they lose their foal coat.

Skewbald

The coat consists of large irregular patches of white and any other colour except black. The line of demarcation between the patches is usually well defined.

Piebald

The coat consists of large irregular patches of white and black. The patches are well defined.

Odd coloured

The coat consists of large irregular patches of white and more than one other colour.

In the USA such coats are termed as Pinto or Paint.

Appaloosa

The Appaloosa is a breed of horse originating in the USA. True Appaloosas have a mottled skin, with white around the eye and hooves that are vertically striped in black and white.

Albino/cream/Cremello

There is no pigmentation of the skin or hair. The

eyes are also devoid of pigment and are pink in colour.

Gender

The gender of an animal and whether it is neutered should be noted on identification forms.

Height

The height of an animal at the time of completion of the form should be stated in centimetres.

Acquired identification marks***Tattoos***

Tattoos are rare in the UK, but they are sometimes found on the inside of the upper lip.

Hoof burns

These are not strictly permanent markings because they grow out with hoof growth. Some hooves are still burnt, usually by the farrier with post codes or other individual marks (Fig. 1.10).

Freeze brands

This method of marking is common. There is a national scheme such that no two horses have the same number and letter combination. Very cold blocks in the shape of letters or numbers are applied to the skin of the animal. This causes a scar, and subsequent hair



Fig. 1.10 Hoof burns are used as a means of identification but they need to be repeated as the hoof grows.

growth is white. It is common for these markings to be placed on the back just behind the withers, to the left of the midline. Less commonly they are seen on the neck or shoulder. In light coloured horses the freezing effect may be prolonged to prevent any hair growth at that site (Fig. 1.11).

Hot branding

Red-hot irons are applied to the skin to burn and scar it. There is no subsequent hair growth. This method of identification is still used for certain breeds, particularly Warmbloods (Fig. 1.12).

Microchipping (identichip)

This newer form of identification is also organised as a national scheme, so that each microchip code is different. A small chip is implanted on the left side of the



Fig. 1.11 This freeze brand identifies the horse as the subject of a settled permanent incapacity insurance claim.



Fig. 1.12 Some examples of common hot brands. All German Warmbloods have used three breeds as foundation stock, with other breeding then being introduced. These three breeds are the Hanoverian, the Trakehner and the Holstein, as illustrated.



Fig. 1.13 Example of a microchip scanner being used.

middle third of the neck, into the *ligamentum nuchae* 2.5–3.75 cm from the dorsal midline (1.25 cm in foals). The chip is then read using an electronic machine that reads the individual code (Fig. 1.13).

To be eligible for registration in the *General Stud Book* (GSB) or *Weatherbys Non-Thoroughbred Register* (NTR), foals born after 1 January 1999 must be implanted with a Weatherbys microchip by a vet. These are implanted in the same place as other microchips.

Microchips are being used increasingly as a means of permanent identification.

Breeds

It is thought that the horse was first domesticated in around 3000 BC and has evolved into the several hundred breeds of horse in the world today. More information may be found from the further reading list.

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