

Equine Injury, Therapy and Rehabilitation

Third Edition

Mary W. Bromiley
FCSP, SRP
Chartered Physiotherapist

Drawings by Penelope Slattery

Photographs by Penelope Slattery and the author



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It should be clearly understood by anyone practising the techniques or giving therapy, as described in this book, that to do so without veterinary permission from the vet normally in charge of the animal, constitutes a legal offence.

It is very important to be aware that there are risks attached to the giving of all forms of therapy and also to personnel, when working with horses or ponies. Neither the author nor publisher can be held responsible in any way for injury sustained to any person or animal if they administer therapy or rehabilitation in the manner described, after reading this book. Neither can the author or publisher be held responsible for any adverse effects or injury resulting from the inappropriate use of massage, therapy machines/apparatus, aids and exercises for therapy and rehabilitation.

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Foreword

I have suffered many injuries through car accidents and falling off horses: a pin through my right ankle, a broken femur with a pin in my knee etc. They say I limp, but I believe God has made me suffer so that I can understand the way horses can feel, even with the most minor injury. Any one who lands on stones, uneven, or hard ground with an injury, however minor, experiences the jarring effect.

However minor an injury, a horse cannot perform to its best. Mary advises us on suitable therapies, whether the horse has had a fall or a specific injury, in order to keep the horse in good shape.

I was sent a horse towards the end of its career that had major problems. Mary looked, pointed out all the many defects and I was upset, but she said 'don't worry, we will have to rebuild him'. I thought she was being rather optimistic, but she said to go back to basics and start at the beginning, long rein over poles, get him to use himself, build his back up on the weak side with weights, lots of long, slow work. The horse in question was Carvills Hill and his history – he went on to win the Rehearsal Chase at Chepstow followed by the Welsh Grand National, a weight carrying performance not equalled and in record time, ridden by Peter Scudamore, whom Mary advised on the best way to make Carvills Hill use himself. He then achieved a phenomenal third consecutive win, the Hennessy Gold Cup at Leopardstown when he was ten years old. It was all down to Mary, her technique, her patience and eye for detail of every muscle on the horse. The latest high profile winner is Celestial Gold; Mary helped him win the big race at Aintree 2006.

I am extremely fortunate to have Mary work for me, sharing her wealth of knowledge and unparalleled expertise which is hugely beneficial when preparing the equine athlete and has helped me to train, to date, over 4000 winners.

*Martin Pipe CBE
Fifteen times champion National Hunt Trainer*

Preface

An ongoing relationship has existed between man and horse since domestication of the latter began, as conclusively demonstrated by archaeological excavation, some 6000 years ago.

For domestication, dictionary definition, 'trained to live with and be kept by man', substitute 'source of multiple usage'; food, transport, and later, following the invention of the wheel, the engine for vehicle/chariot. Archaeologists suggest the relationship may have actually been mutually beneficial, a two-way adaptation, rather than man dominance. A type of compatible evolution, the horse possibly recognising stewardship by man, reduced the ever-present danger of attacks by predators, man realising a source of semi-tame meat was advantageous.

When tamed and ridden, the speed of the horse was also advantageous, at full gallop, times of up to 70 k per hour have been recorded. Another plus was the fact that unlike the domesticated, cloven-footed species, camel, ox, sheep, and goat, the horse was able to survive, due to an unique digestive ability, on poor-quality forage; the equine caecum able to break down the cellulose contained in stalks, stems, leaves, and coarse grasses indigestible in other species. The horse can also digest even when on the move, unlike the cloven-footed species, who not only require a better type of fodder, but even if this is available, require long periods of recumbency to 'chew the cud', a process of regurgitation required to achieve fermentation. This factor reduced their usefulness as a means of transport.

Mechanisation has changed the role of the horse; no longer required, except in a few remote areas, as a means for transport and survival, the animal has become, not just a source of pleasure, but a competition adjunct, enabling man to extend his prowess through equestrian sports; polo and racing both brought back from the Mongolian steppes; dressage, originating from movements taught for combat survival; chariot racing has been replaced by competitive driving. Show jumping, eventing, endurance riding, the list continues to expand, the most recent being horse-drawn surfing.

This transition from necessity to pleasure has tended to distort the true nature of the horse, due to the incorrect assumption that human thought processes and concepts, particularly when preparing for athletic prowess, also apply to the horse. Man and horse are two very differing species and an appreciation of this fact is essential for those working with horses, particularly those who work as trainers and therapists for with every type of physical activity there is the possibility of injury. This book attempts to increase the understanding of those involved with horses, by explaining, in relatively simple terms, the interaction and reliance of the body systems one to another, the construction of the musculoskeletal system, the general effects of injury, and the repair processes of tissues following damage in a species differing from man.

Added to this information, the text contains, as far as they are currently understood, the facts about therapy machines along with a description of the varied methods of aiding repair, this in order to enable the reader to make an informed choice from the available options; it may entail simple applications of heat, cold, massage, or possibly the use of sophisticated machines. Also described is the advisability of, and reasons for, controlled activity.

Acknowledgements

My grateful thanks go to the members of the veterinary profession who have trusted me with their patients, and to all the owners, trainers and head lads who, over the years, have given me support and help by allowing me to work with them and their horses. Thanks also go to my two daughters Pelly and Rabbit who work with me and without whose help the rehabilitation would be impossible.

*Dedicated to my late Father
Robert Hamilton Miller,
Veterinary Surgeon and Medical Practitioner*

1

The Musculoskeletal System Explained

Introduction

The goals following tissue breakdown are similar in both man and horse; to restore the pre-injury state of the whole by persuading the affected tissue to repair as rapidly and efficiently as possible. The first consideration, when something goes wrong is, 'Why did it happen'? Sometimes the answer is obvious, but in most cases a broad-based investigative route is required to source the primary cause of the problem.

A quick illustration to demonstrate that treatment of the obvious may not constitute a cure. A patient presented with a tennis elbow, appropriate treatment resolved the problem, three weeks later she was back needing further treatment. In-depth discussion unfortunately failed to identify the cause. Shortly after her fifth treatment she was spotted wrestling with an up-and-over garage door. It was suggested that the garage door mechanism be oiled and she did not reappear for treatment. When the account was paid an enclosure stated, 'Quite an expensive oil can!'

To ensure successful treatment outcome the many different characteristics of man and horse need consideration. The 'tree' of evolution has many divisions but species follow two main routes: those which kill in order to eat (predator) and those that are eaten (prey).

Man is a predator (killer), the horse a prey (food source). Domestication has required that the predator, man, sits on his prey the horse, small wonder that things can go wrong particularly when it is appreciated that the prey, despite domestication, retains all its endowed survival instincts, these include the flight reaction in response to fear and the requirement to survive a presumed attack by fighting.

All predators are born helpless, all prey species are fully functional within minutes of birth and this is not the only difference between the two types of species (Figs 1.1 and 1.2; Table 1.1).



Figs 1.1 and 1.2 Human baby and foal the same age.

Symbiosis between human and veterinary medicine does exist despite there being specific differences between species. In order to be successful when working with injury these variations should be understood and appreciated.

It is also essential to remember the limitations of the basic horse, particularly with regard to learning ability, rather than rely on man's imposed interpretation of its thought processes and behaviour.

Table 1.1 Man versus horse.

Man	Horse
Species: predator	Species: prey
Biped	Quadruped
At birth	
Helpless	Fully functional within 15/20 mins
Cortex partly programmed	Cortex fully programmed
Recumbent, no balance	Stands, moves, perfect balance
Primitive reflex responses	Survival reflexes, fright, flight, fight, fully operative
Maternal recognition?	Maternal recognition, smell. Sight?
Diet	
Early diet milk. No teeth	Milk, supplemented by grazing
	Teeth developed
Carnivore/herbivore	Herbivore
Anatomical variations	
Brain weighs approx. 3 lbs/1.3 kg	Brain weighs approx. 1.5 lbs/0.65 kg
Vertebral architecture for mobility	Vertebral architecture for stability
Intravertebral discs (spine)	Fibro cartilage discs (spine)
Collar bone links arm to body mass	No collar bone, forelimb (arm) attached by muscle only
Muscles distal limbs and feet	No muscles distal limbs or feet
Gall bladder (fat metabolism)	No gall bladder
Muscle composition well researched (cell)	Muscle composition poorly researched (cell)
Profusion of non-return valves, in veins, distal limbs	Poor supply/absence non-return valves, in veins, distal 1/3 limbs
Moderate skin sensation	Hypersensitive skin
Some body hair	Total body hair covered
Efficient ability to lose heat	Poor ability to lose heat
Extra pyramidal tract (fine movement control)	No tract after C2 sensation/ appreciation of space via whiskers
Conscious/calculated thought processes	Responds to harnessed reflexes
Full spectrum colour appreciation	Limited colour appreciation
Frontal vision only, unless head moved	360° vision

The concept of treatment and rehabilitation following athletic injury is now an acceptable part of veterinary medicine and is the task of suitably qualified physiotherapists. The physiotherapist is part of a team headed by the veterinary surgeon in charge of the case.

By law the vet must make the initial diagnosis and write giving permission to the physiotherapist in order for her/him to administer appropriate therapy. This requirement applies to any person offering or practising any form of therapy (Veterinary Act, see Appendix I).

Originally, the physiotherapist had only his/her hands to work with, but with the arrival of the machine era, physiotherapists were taught the effects the varied devices had on tissue. An in-depth knowledge of anatomy and physiology allows for the choice of machine most appropriate for the condition diagnosed, and furthermore, an understanding of healing gives the knowledge needed to change machines as the recovery pattern dictates.

Therapy machines have, in the main, been developed for use in the human field, with no adaptations for use in veterinary medicine other than the reshaping of pads or the changing of machine names – for example, a therapeutic ultrasound machine has been renamed a Vet Sonic.

Although recently a few trials have been instigated it should be understood that the exact effects on the tissues, be they those of man or horse, resulting from the stimuli delivered from many of these human-oriented machines are still unknown. However, fractures, sprains, strains, arthritis, muscle tears, bruising and painful backs, are all common to humans and horses, and electrotherapy is being widely used to treat athletic injuries in both species, despite the fact that benefits remain largely speculative. Unfortunately, if technology is available it will be used even if the end result is not known.

Therapy machines are available for purchase by the layman, but little has been written describing the best time during the healing process to use the machines, the contra-indications to usage, or the dangers of over dosage and usually the only available literature are the manufacturers' pamphlets.

Reliable information can be found in science-based textbooks, but these are written solely for professionals, qualified members of the medical or veterinary profession. Understanding the text requires in-depth, specialist knowledge. In an ideal world, only professionals should use the machines but many have been sold to the layman and unfortunately, they are often used to the detriment rather than to the advantage of the patient.

It is very important to realise that there can be no exact criteria as to treatment times or dosage – each case should be judged on the individual circumstances.

It is also important to recognise that no one machine can be expected to fulfil all requirements, each has a specific effect. The purpose of all therapies, including the use of machines, is to enhance the natural, inbuilt, healing abilities of the body, with the aim of restoring full function to the injured area and thus minimising secondary trauma.

Nearly all tissues, other than central nervous tissue, have the ability to reconstruct to their original state. The programme for healing follows a set pattern which is instigated, in the main, as a result of specific chemical signals. For example, blood leaking from a damaged vessel is considered free blood. Free blood within or adjacent to bone changes the normal chemical balance of the area, messages flash to appropriate recovery units, cells migrate to the area of damage and construct, to a pre-set pattern, which includes very precise timing, the new bone. Over time, and in response to exercise stress, the damaged bone remodels, eventually resembling its pre-damage configuration. Research has demonstrated that the use of therapeutic ultrasound given for, or during, the first ten days post injury will enhance the mobilisation of the first set of bone repair cells, the *osteoclasts*. Given *after* ten days, therapeutic ultrasound reverses the repair programme because signals from the machine have interfered with the natural, body induced, sequence of events. This reverse effect might be useful for treating a splint when the object is to dissuade the body from creating an unsightly bone mass but is of little use in, for example, a knee injury when a slab fracture of a carpal bone has been diagnosed and is healing.

There are many unscientifically based claims that machines accelerate healing and these have yet to be proven. Some of the machines may induce an earlier start to the natural repair processes of the body thus enhancing the natural succession of tissue response. However, health and performance go hand in hand, no type of therapy can cure a problem or enhance performance if the original cause of the problem or poor performance is not sought. This requires team work involving a large number of people and an understanding of the inter-relationship which exists between all the body systems

Members of the team

The horse

Horses are amazingly adaptable but conformation cannot be changed and consideration must always be given to this fact since conformation may limit performance. Conformation is determined by genetic make up and attempts to change or correct a naturally adopted gait can lead

to inappropriate strain within associated structures, often resulting in lameness.

Muscles take time to model in response to demand as does bone. Horses are often asked to progress too rapidly, before their musculoskeletal system is adequately prepared. There is a big difference between being conditioned and being fit.

The hypothesis, now described as Wolff's Law, of Julius Wolff (1836–1902) has never been disproved. He stated 'adaptive changes in the structure and biomechanical properties of bone occur in accordance with functional demands'. The skeleton and the soft tissues need adequate preparation time to ensure that at cellular level their structures have remodelled and adapted to fulfil requirement.

There is no point in trying to teach the horse a new task until it is physically capable of performing the task. This is particularly important, given the fact that if muscles are inadequately prepared, they become fatigued and fatigue leads to discomfort. Because the horse is endowed with survival instincts, when discomfort is felt, the animal will alter the way it recruits muscle, imperceptibly changing from an economic movement pattern to a painless movement pattern, thus creating secondary areas of stress. The new pattern will also be logged in the movement centre of the brain as normal and therefore remaining even when the discomfort resolves. Should this happen in man voice direction and visual example are employed to re-establish normal movement.

The veterinary surgeon

The veterinary surgeon is the most important person in the health team. It is sensible to have a horse examined pre purchase by your own vet. Should anything go wrong the vet will have the advantage of already knowing the horse. Unfortunately, there is often a reluctance to consult a vet, rather as man tends to avoid the doctor lest something unpleasant may be heard. Vets and doctors are bound to tell the truth, be that pleasant or unpleasant. However, leaving a problem may, and unfortunately often does, result in irreversible changes.

The veterinary profession is generally very amenable to enlisting help from team members with expertise in complementary professions, farriers, dentists and trainers. To be asked to help when all else has failed is not so much irritating as frustrating.

The rider

Riders damage horses rather more often than a horse damages its rider, usually because muscle fatigue is overlooked during training and a

horse is asked to repeat a task again and again. Try press ups and see how long you can repeat the exercise before you tire, relate this to the hour of concentrated flat work demanded from your horse.

Beginners, new to horses, often think two novices can develop together. Sadly, this usually leads to confusion in the horse and disappointment in the rider.

Experienced riders will often 'feel' all is not well when on a horse; over time their body instincts have become so tuned that these have become, without conscious thought, a source of information. These experienced riders are easy to help because the information they provide should help the appropriate team member both to identify and deal with the primary cause of the problem.

The groom

A good groom is the horse's nanny. Their input is essential to all other members of the team provided they have been taught to observe. Small observations make for improved help from other team members. The dentist needs to know if the horse is quidding its food, the nutritionist the state and smell of the urine and droppings, the masseur if the horse is cold backed and the physiotherapist if lameness wears off after warming the horse up.

The dentist

Comfort in the mouth is essential, any evasion caused by discomfort will affect the head position. There is important inter linkage between head, neck and back. The position of the head, and consequent break over in the neck affects through tension created in the nuchal ligament the supraspinous ligament which supports the back. Thus the position of the head determines the ability of the horse to lift the back. This lift, in association with muscle groups taking origin from the nuchal ligament, enables the horse to carry the rider without being hollow.

Teeth should be checked at least twice a year, and preferably every three months in young stock.

The blacksmith

No foot no horse.

The foot is designed to absorb, in part, the compaction forces generated by foot fall during movement. These can reach unbelievable peaks when body weight is momentarily born on a single limb, following the airborne phase. The absorption capacity of the foot is helped by