On the back of the horse - from evolution to athletic performance

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This presentation is a personal view that follows the horse’s progress from its evolution >50 million years ago to modern athletic performance. It will be based on 45 years of involvement with horses and clinical research, and will highlight 6 areas of progress with particular emphasis on the horse’s back!

1. Back to the beginning

The evolution of the horse is a topic that is both fascinating and of crucial importance to the civilisation of man. Horses have been around for >50 million years, and have been the most successful herbivores on the planet. They are part of the phylum Perissodactyla, and through the eons of climate change have adapted dramatically and most beautifully into Equus caballus to become one of the animals with a central role in the development of our civilisation.

The ‘dawn horse’ (Eohippus) identified in 1839 from a fossil more than 50 million years old, was a successful forest dweller, about 25 cm tall with 4 toes. It was rabbit-like and originally thought to be a hyrax. Eohippus browsed on lush leaves and plants using small sharp teeth with low crowns.

A gradual and remarkable transformation of this creature took place over 50 million years, through the Oligocene, Miocene and Pleistocene to the present day. This changed the little browser into a single toed grazer with superb dentition and limbs modified for speed with the development of the rotatory gallop.

2. Backing the horse

Domestication into human society began some 25,000 years ago as horses moved around the globe. The earliest association between man and horse was of man hunting horses for food. Bones of 40,000 skeletons were found in a single grave in France. To early man the horse became food, drink, weapon, friend and even god! But by the time of the Greeks and Romans, equestrianism had been well established. Xenophon’s famous book, ‘Art and Horsemanship’, was published 2400 years ago, and chariot racing became a sport around 1500 years ago.

From its place as war horse in the 17th century, the Thoroughbred was born, and so racing and equestrian sport could really get underway!

3. Back to science

There is no doubt that exercise physiology has made an enormous scientific contribution to our knowledge of training and athletic fitness over the last 40 years. We also know that one of the major limiting factors in racing and horse sport is lameness, and this causes huge economic losses for the horse industry. A better understanding of bone and equine locomotion has greatly assisted in reducing this wastage. Horses have extremely dense cortical bone in their distal limbs to counteract the forces involved in athletic performance. There are specific effects of exercise on bone in young horses (6–18 months) that can strengthen bone by increasing its density and mass, while reducing the effects of local bone strain. A good example of where this effect fails is ‘shin soreness’ (dorsal metacarpal disease).

4. The ‘back’ problem

For so many years back problems have been a mystery to clinicians, owners and trainers. My contribution to this area was to try and instil some rigour into the clinical examination of horses with a potential back problem, and provide some evidence for the different categories of back conditions, supported by some facts about pathology. This whole area has developed enormously in the last decade or so, and is no longer the ‘dustbin’ for cases that could not otherwise be diagnosed. I believe the future is now bright.

5. Backs to the wall

For over 35 years I have been concerned about the challenging role of the veterinary profession in international equestrian sport. Unfortunately, for so many years we were only called in to assist at times of crisis, and usually ended up taking most of the blame for catastrophes in eventing and endurance, particularly heat stress and exhaustion. The Federation Equestre International (FEI) has provided us with a platform for much greater veterinary involvement. In the last 20 years major strides have been made in controlling infectious disease at events, improving standards of doping/medication, particularly in the controversial use of nonsteroidal anti-inflammatory drugs (NSAIDs). Our advice and contributions are now sought well before the crisis, giving us time to adequately address each specific problem.

6. Backs to the wall

From my point of view the welfare of the horse in sport is paramount, and the veterinary profession has a considerable responsibility to ensure that competing horses are protected from any form of abuse. My role in the FEI has been mainly to encourage research into a number of important welfare issues in elite competition (Olympic Games and World Championships). I think our profession’s greatest contribution to equestrian sport in recent times was the international research effort to understand the physiological limits of performance in extreme hot/humid conditions before the Olympic Games in Atlanta in 1996. This work was extended to the Beijing Games in 2008 where the weather threatened the safety of the horses and the Olympic schedule.

Finally, I wish to comment on an abuse of horses (rapping and hypersensitisation) in jumping that has been going on for decades.
The FEI has at last developed a protocol to prevent this occurring in international competition. The basis for this protocol was a careful clinical assessment coupled with the use of thermography. This was based on research funded by the FEI to determine abnormal heat and inflammation in the distal limbs of horses.

7. To the front at last!
The ongoing developments in clinical research and veterinary care will continue to assist equestrian competition, exercise physiology and horse welfare. I believe the veterinary profession is in a much stronger position than it was 20 years ago.