

Get a Healthy Start

If you want tough future performers, turn those babies out

BY HILARY CLAYTON, BVMS, PHD, MRCVS



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The information in this article is based on a presentation given by Dr. Clayton at the 2006 Adequan/USDF National Convention.

THE ARTIST GEORGE STUBBS painted many beautiful scenes of mares and foals in pastoral settings. Research is now showing that this lifestyle may be just what Mother Nature ordered to enhance athletic performance and preserve soundness later in life. Evidence is accumulating from studies all over the world—including Japan, New Zealand, the Netherlands, the UK, and the US—that the type and amount of exercise in a horse's first year of life have a profound effect on his musculoskeletal growth and development.

Stimulus and Adaptation

Horses are a physically precocious species: Foals are able to stand and run with their dams within a short time after birth. A



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foal's newly acquired locomotor skills place very different stresses on his musculoskeletal system than the uterine environment. These stresses stimulate the bones, joints, muscles, ligaments, and tendons to adapt to their distinct and different roles in locomotion (see "The Equine Musculoskeletal System" on page 16). Consequently, the structure and composition of the juvenile musculoskeletal tissues change rapidly in the weeks and months after birth.

In general, the tissues of the body respond to the stimulus of exercise by becoming stronger and better able to withstand the stresses imposed by regular exercise. The window of time during which these changes occur varies among different tissue types. Muscle and bone retain the ability to respond to exercise into adulthood. This means that, even in a mature horse, bones and muscles can adapt to athletic training and repair them-

selves following an injury. In contrast, tendons, ligaments, and articular cartilage (see sidebar for definitions) have matured by the time the horse is two years old. Beyond this age, their ability to adapt in response to exercise or to heal following an injury is limited. Therefore, the amount and type of exercise that a horse receives before his second birthday is critical in determining the future strength and long-term soundness of his joints, ligaments, and tendons.

When they are first turned out on pasture, most newborn foals stay close to their dams for a few days. As time goes by, they become more independent and adventurous, wandering further away and beginning to play with other foals. On a typical day, a foal spends most of his time lying down, standing around, and grazing. Foals turned out all day long engage in locomotor activities only for about three hours a day, most of it at a walk. Canter occupies about seven minutes each day: Foals typically sprint a short distance, then slow down and walk, rest, or graze for a while. Very little time—only about three minutes a day—is spent trotting, with foals generally preferring to canter. This type of exercise, involving short sprints separated by longer periods of walking or resting, is ideal for strengthening the tissues of the limbs at this stage in their growth and development.

The Effects of Management

A Dutch study compared the effects of three types of management on the development of foals' locomotor tissues. From birth to five months, one group of foals was kept on pasture. A second group was confined to box stalls, with no turnout.

A third group was also raised in box stalls but each day received a single bout of sprinting exercise on a firm surface over a distance equivalent to that covered by the foals living on pasture.

By the time they were five months old, the pastured foals showed the most beneficial changes in the biochemical composition and microstructure of their locomotor tissues. Lack of exercise in the foals reared in box stalls appeared to inhibit tendon development, although the detrimental effects could be somewhat counteracted if the foals were turned out from six to twelve months of age. However, the researchers found that the stall-kept foals who were subjected to periods of forced exercise were prone to sustaining permanent damage to their still-developing tendons. Such damage cannot be repaired later in a horse's life.

The Dutch study also showed that exercise (or the lack thereof) led to differences in the foals' way of going. Stall-bound foals had exaggerated, "goose stepping" limb movements; whereas foals reared on pasture developed a flatter, more efficient stride. Those foals subjected to forced exercise showed a remarkable difference between the locomotor patterns of the fore and hind limbs: The hind limbs moved efficiently, similar to the pasture-reared foals, as a consequence of changes in the coordination pattern and muscular adaptation in the hindquarters. In the forelimbs, the movements were like those of the confined foals. Gait patterns remained adaptable, however, and became more normal in response to exercise as the foals grew older.

The Value of Playtime

Allowing a foal to exercise freely appears to be the best way of building his locomotor-tissue strength and of reducing the risk of injury later in life. Bone responds best to high loads and rapid loading rates, as occurs during galloping, though this type of exercise does not have to be prolonged. The short sprints performed naturally by foals at pasture are ideal for stimulating bone growth. ➤

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The type of exercise that is optimal for the development of other tissues is less well defined. Rapid accelerations and decelerations, sharp turns, and play behavior (such as rearing, bucking and leaping) provide a diverse loading environment that stimulates multidirectional strengthening of all the locomotor tissues. If the pasture has hills and different types of footing, so much the better in terms of building stronger athletes.

Management practices during the first two years of a horse's life clearly has a profound effect on a performance horse's future soundness and longevity. The Dutch researchers' findings are relevant to both sport-horse breeders and trainers, who might want to inquire about a horse's early management regimen before making a purchase. ▲

MEET THE EXPERT

Hilary Clayton, BVMS, PhD, MRCVS, is a world-renowned expert on equine biomechanics and conditioning. Since 1997, she has held the Mary Anne McPhail Dressage Chair in Equine Sports Medicine at Michigan State University's College of Veterinary Medicine, East Lansing. The position focuses on dressage- and sport-horse-focused research.



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