

Equine meeting talks about athletic ability

Several factors that affect the soundness and future athletic ability of young growing horses — especially equine athletes — were discussed at the recent KER Nutrition Conference.

By **JOE D. PAGAN***

KENTUCKY Equine Research (KER) hosted its 15th annual KER Nutrition Conference Oct. 16-17 in Lexington, Ky. This year's conference focused on factors affecting the production of the equine athlete. A number of researchers in the fields of nutrition and veterinary medicine detailed the numerous factors that may affect soundness and future athletic ability in young growing horses.

Dr. Stephanie Valberg from the University of Minnesota College of Veterinary Medicine opened the conference with a review of muscular development in foals. She reported that the metabolic and contractile adaptations in skeletal muscle present at birth provide the means by which young foals stand within minutes of being born and develop the quick burst of speed and rapid glycolytic metabolism necessary to evade predators.

Equine muscle contains high muscle glycogen content and glycolytic capacity from birth, and mare's milk provides a rich source of sugar for energy metabolism. During the first years of a horse's life, there is a shift in fiber type proportions in favor of type 2a fibers at the expense of type 2b fibers. Depending on breed, there may be a gradual increase in the oxidative capacity of type 2 fibers in the first year of life, which progressively evolves over the next two years, providing enhanced staying power and a slightly slower speed of muscle contraction (decreased type 2a:2x ratio).

Valberg concluded that initiating

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training at less than a year of age does not appear to hasten the changes that occur naturally with growth, and its impact appears to be less in young growing horses than when training is begun at 18 months to three years of age.

Early exercise

Dr. Chris Kawcak from Colorado State University's Orthopedic Research Center summarized results from an early training study conducted by the Global Equine Research Alliance. This group is comprised of researchers from Massey University in New Zealand, Colorado State University in the U.S., the Royal Veterinary College in England

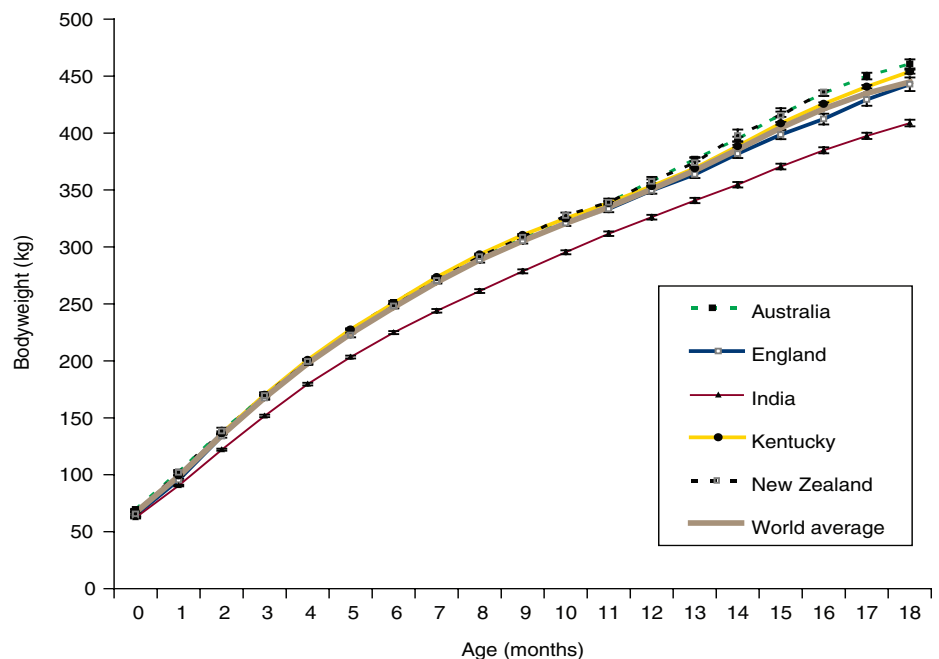
and the University of Utrecht in the Netherlands.

The goal of the study was to determine the effects of exercise at an early age on musculoskeletal tissues in the horse. The researchers' hypothesis was that early imposed exercise would strengthen all tissues, thus preventing tissue damage later in life. Thirty-three Thoroughbred foals were divided into two groups and subjected to different exercise regimens.

Exercise beginning at 10 days of age did not have a detrimental effect on clinical, histologic and biochemical parameters of musculoskeletal tissues. Early exercise had a beneficial effect on cellular and matrix features of the articular cartilage, and it induced a significant increase in bone formation rate at eight months of age.

However, the overall effect on bone fraction at the end of the study (18 months) was minimal. Therefore, it appears that control horses may have regulated bone content with normal pasture exercise and growth.

1. Bodyweight \pm 95% confidence interval (kg) of Thoroughbreds reared in Australia, England, India, Ireland, the U.S. and New Zealand compared with the world average



Foal development

KER presented several studies related to the growth and skeletal development of Thoroughbred foals from around the world. In one report, Thoroughbred mares (n = 3,909) and their foals born in central Kentucky were studied to assess the influence of month of birth, season and gender on bodyweight, condition score and daily weight gain.

Month of birth affected growth of suckling foals, as winter-born foals were smaller at birth and grew more slowly during the first two months compared with spring-born foals. Mare weight change and body condition score appeared to be related to seasonal and management factors, as winter-foaling mares lost weight, showing lower bodyweights and lower body condition scores post-foaling than spring-foaling mares.

Later in lactation, when pasture availability increased in the spring, winter-foaling mares gained more weight and supported faster growth rates in their foals than later-foaling mares. Faster growth rates exhibited by winter foals at three to four months of age may be due to greater milk production, greater pasture intake by the foals or a combination of both.

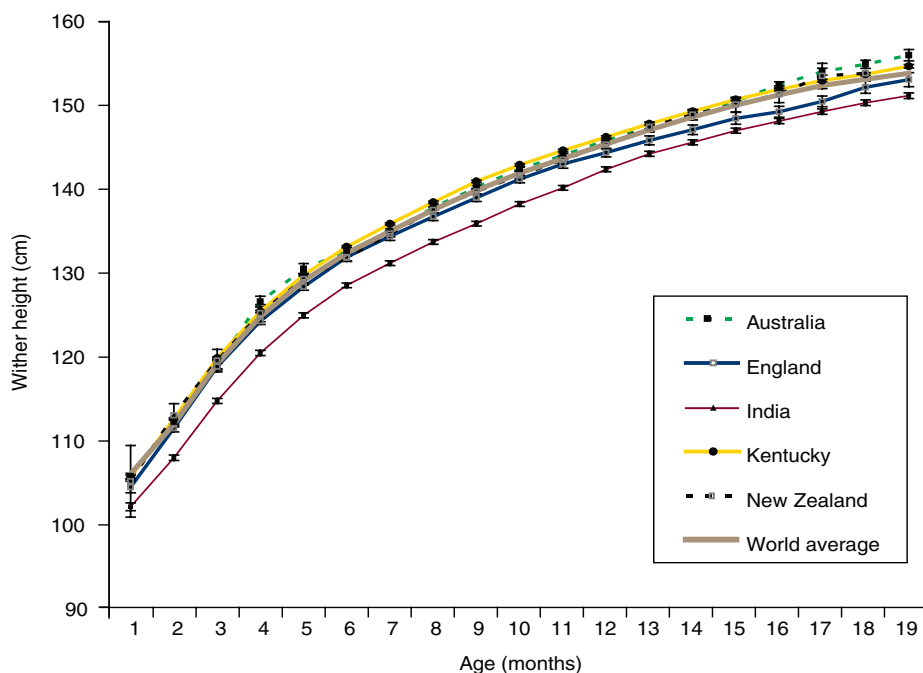
In another presentation, bodyweight and withers height data from birth through 18 months were reported for 13,429 Thoroughbred foals raised in the U.S., England, Australia, New Zealand and India (Figures 1 and 2).

Australian Thoroughbreds were significantly heavier and taller at seven days and 18 months of age than Thoroughbreds in all other countries. English Thoroughbreds were significantly lighter between seven days and four months of age than in all other countries except India.

At four months of age, there were no significant differences in foal bodyweight between countries, with the exception of foals in India, which were significantly smaller.

In a final KER presentation, racing performance data were collected from 3,734 Thoroughbreds raised in the U.S. between 1996 and 2002, and their growth records were retrospectively examined to determine if various growth characteristics could be associated with success as a race horse.

2. Withers height \pm 95% confidence interval (cm) of Thoroughbreds reared in Australia, England, India, Ireland, the U.S. and New Zealand compared with the world average



The population consisted of 1,850 fillies and 1,884 colts raised on 55 commercial and private farms in the states of Kentucky (n = 3,199), California (n = 183) and Virginia (n = 352).

Data from this study suggested that tall but not heavy young growing horses are more likely to become successful athletes. Smaller horses were more likely to start as two-year-olds and have more career starts; however, elite performers (stakes winners, graded stakes winners, G1 winners and millionaires) tended to be taller and heavier.

Nutrient requirements

Dr. Laurie Lawrence from the University of Kentucky presented an overview of the changes in nutrient requirements for pregnancy and growth that will occur in the sixth revised edition of the National Research Council's Nutrient Requirements of Horses. Lawrence is the chair of the committee charged with creating this revision, which is due to

be published early next year.

Lawrence reported that the energy and protein requirements for pregnancy have been revised so that individual monthly recommendations will be made for the last seven months of gestation rather than just the last three months as in the previous edition. These new pregnancy requirements have been calculated by partitioning nutrient needs for pregnancy into four categories: (1) maintenance of the mare, (2) growth of the fetus, (3) development of the placenta, uterus and mammary gland and (4) maintenance of tissues of conception.

Energy requirements for growth have also been recalculated using new estimates of maintenance energy requirements, which are higher than previous editions, and higher efficiency estimates for the initialization of energy for growth.

To obtain a copy of the proceedings from the conference, contact KER at (859) 873-1988 or info@ker.com.