

Relationship Between Foal Growth, Survey Radiographic Findings, and Sales and Racing Performance in Thoroughbred Racehorses: A Global Research Initiative

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Introduction

Skeletal soundness is of prime importance for Thoroughbred racehorses, and breeders pay particular attention to radiographic abnormalities that may affect a yearling's sale price or future racing performance. Most breeders take survey radiographs of yearlings to assist in decisions regarding future medical or surgical treatment. While large foal body size and excessive growth rates have been implicated as factors contributing to developmental disorders in Thoroughbreds, it is still unclear how these are associated with the incidence of abnormalities in survey and sale radiographs. Therefore, a pilot study was conducted in Kentucky to assess whether foal body weight or withers height is significantly associated with these radiographic findings and whether radiographic findings are associated with sales and racing performance.

Pilot Study Materials and Methods

Six commercial Thoroughbred breeding farms in Kentucky participated in a study from 2013-2017 to evaluate the relationship between the body weight and withers height of foals with findings from radiographic survey and sale radiographs. Each of these farms was enrolled in a weighing program conducted by Hallway Feeds in Lexington, Kentucky. On a monthly basis, Hallway technicians weighed and measured withers height of the foals at each farm. A total of 318 foals from 12 individual foal crops were included in the study.

Growth measurements (body weight using an electronic scale and withers height using a measuring stick) were taken approximately every 30 days. Growth variables were converted into population percentiles for analysis using Kentucky Equine Research's Gro-Trac[®] growth-monitoring software. Percentiles rank the relative size of individuals in a population regardless of gender and age.

The average percentile body weight (BW) and withers height were calculated for each foal at four ages: the first age range was from birth to 30 days of age (foal); the second age group was from 31 to 180 days of age (suckling); the third age range was from 181-360 days of age (weanling); and the final age group was >360 days of age (yearling). The foals were further divided into quartiles based on whether they were in the lowest 25% (1st quartile), the 25-50% (2nd quartile), 50-75% (3rd quartile) or highest 25% (4th quartile) for both body weight and withers height. Additionally, foals were divided into groups based on their month of birth.

To evaluate the relationship between size and skeletal problems, each horse's survey radiographs were assessed for osteochondritis dissecans (OCD) and sesamoiditis. Sale radiographs were also assessed for yearlings offered for sale at public auction. Sales and racing performance data were gathered from publicly available records.

Pilot Study Results

The incidence of OCD and sesamoiditis were associated to varying degrees with body weight and height during growth. Additionally, the joint affected and the time that sesamoiditis is detected had different associations with subsequent sales and racing performance.

Yearlings with fetlock OCD tended to be larger as foals and taller as sucklings, but their sales and racing performance was not negatively associated other than that their number of lifetime starts tended to be lower than the rest of the population. Yearlings with hock OCD tended to be taller as foals, but their sales and race performance was not negatively associated other than that age at first start was later. Fewer yearlings with hock OCDs started as two-year olds compared to the rest of the study population. Yearlings with stifle OCDs were larger as foals and tended to be taller as foals, sucklings and weanlings. Stifle OCD was *negatively* associated with both sales price and race earnings. Yearlings with sesamoiditis in survey radiographs tended to be *smaller* than the population as foals. They also tended to make fewer lifetime starts than the rest of the study population. Sesamoiditis in yearlings at sale time was negatively associated with sale price but not subsequent racing performance. Of the developmental disorders measured, stifle OCD was by far the most negatively associated with future sales and racing performance.

Limitations to Pilot Study

While this pilot study produced some intriguing results, its relevance to the global Thoroughbred breeding population has limitations. First, it evaluated a limited population of foals (318) on a limited number of farms (6) in one geographic area (Kentucky). Differences in management practices and genetics on these farms could have played an important role in the frequency and severity of skeletal disorders. Second, the manner in which radiographic findings were classified was not completely uniform between survey reports. For future studies, a system to more uniformly describe the type, severity, and location of each finding should be developed so that results can be compared more accurately across farms, regions, and veterinary practices.

Future Studies

Kentucky Equine Research would like to create a consortium of veterinarians in major breeding centers around the world to develop an efficient system to gather radiographic findings from Thoroughbreds and compare those findings with growth, management, and nutritional information to determine what factors are most important in the etiology of development disorders. Additionally, these data would be used to determine the incidence of findings in different regions and their association with future sales and racing performance. These studies would be conducted with the permission and cooperation of the farm owners in each region, and the identity of the participating farms and their horses would remain anonymous.