



# Relationship Between Foal Growth, Survey Radiographic Findings, and Sales and Racing Performance in Thoroughbred Racehorses: A Pilot Study



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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.

On a monthly basis, growing horses were weighed and measured, and 318 horses from 12 individual foal crops were included in the study. 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 and withers height were calculated for each horse at four ages: the foal range was from birth to 30 days; the suckling group was from 31 to 180 days; the weanling was from 181–360 days; and the yearling group was >360 days of age. The horses 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, the 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. This study showed that the size and growth rate of foals is associated with the incidence of both OCD and sesamoiditis. Size also is related to sale price and racing performance.

## Summary of Key Findings

1. Small foals (1st and 2nd quartile weight and 1st quartile height) are less likely to develop OCD than larger foals. Foals in the 3rd and 4th quartile are at greater risk.
2. This pattern was pronounced with stifle OCD. Heavy foals (3rd and 4th quartile) and tall foals, sucklings and weanlings (3rd and 4th quartile) are at greater risk of stifle OCD.
3. Nearly 10% of yearlings had surgery for OCD after survey radiographs, but several sale yearlings developed fetlock OCD, which was not evident on surveys.
4. Yearlings with sesamoiditis in their survey radiographs were of average weight as foals and their body weight did not change significantly as sucklings or weanlings, but percentile height was significantly taller as both sucklings and weanlings compared to foal height.

5. Yearlings that had sesamoiditis in their sale radiographs tended to be average weight as foals and slightly below average as sucklings. They gained weight as yearlings and were significantly heavier at sale time.
6. OCD and sesamoiditis tend to occur in different animals. Only 20% of horses with OCD in survey radiographs had sesamoiditis.
7. Over 40% of yearlings with sesamoiditis in survey radiographs were still affected in sale radiographs, and about 40% of yearlings with sesamoiditis at the sale were new cases.
8. February-born foals were small as foals and sucklings but grew rapidly as weanlings. April- and May-born foals were larger and taller.
9. Survey radiograph sesamoiditis incidence was higher in February-born foals.
10. The high incidence of OCD observed in April-born foals may be related to their large size as foals and/or younger age at time of survey radiographs.
11. There was a strong positive association between both yearling body weight and withers height and yearling sale price.
12. Second quartile foals and yearlings had the highest percentage of winners and stakes winners.
13. Hock and fetlock OCD did not adversely affect sales price or racing performance, but horses with hock OCD were older at their first start. Stifle OCD adversely affected both sales price and racing performance.
14. Sesamoiditis at sale reduced sale price.
15. Horses that had sesamoiditis in their sale radiographs had more starters and winners from foals and winners from starters than horses without sesamoiditis, but they were represented by fewer stakes winners and graded stakes winners.
16. Sesamoiditis in either survey or sale radiographs did not affect age to first start.

## Conclusions

This study showed that extremes in body weight and height, either too big or too small, during the first 18 months of life are not ideal for Thoroughbred racehorse performance. However, since large body weight and height are rewarded in the sale ring, striking a balance between size and soundness is important for commercial success. Month of birth is a critical factor in how foals grow and may play an important role in both OCD and sesamoiditis. February-born foals are born small and grow faster once weaned, while the opposite is true for later-born foals.

April- and May-born foals are born large, lag post weaning, and may experience compensatory growth during sales prep. Adjusting mare feeding to compensate for poor pasture availability early in the season, high-quality pasture in spring, and maintaining consistent growth with later-born foals post weaning may help reduce the incidence of skeletal disorders in growing Thoroughbreds.

Because this study only involved 318 foals from six farms in central Kentucky, its findings should be considered preliminary. A larger study is currently being conducted with more Thoroughbred farms in Kentucky as well as with breeders in other major breeding centers around the world. The goals of these studies are to identify at-risk foals earlier, modify feed and management practices to reduce problems, and ultimately raise better racehorses.



Miss Finland during yearling sale preparation and during her racing career. Photo credit: Arrowfield Stud