

THE EFFECT OF EARLY WEANING ON GROWTH AND DEVELOPMENT IN THOROUGHBRED FOALS

J.D. Pagan, S.G. Jackson and R.M. DeGregorio

Kentucky Equine Research, Inc.
Versailles, KY 40383
and Land O'Lakes, Inc.
Fort Dodge, IA 50501

Introduction

Thoroughbred foals raised in the United States typically remain with their dams for four to six months before they are weaned. Some breeders supplement nursing foals with additional feed while others feel it is better not to feed foals separately until they are weaned. If a foal is orphaned early in its life, then it is either raised on an artificial milk replacer or placed with a foster "nurse mare". The purpose of this study was to compare the growth and development of Thoroughbred foals raised under four different management systems.

Experimental Design

Growth rates of 40 Thoroughbred foals were measured to assess four different management systems for raising foals during the first six months of age. The foals were divided into groups as follows: Group 1 (milk replacer) consisted of 8 foals that were weaned at 5 days of age. These foals were fed a commercial milk replacer¹ along with a milk transition formula pellet² for three months, after which they were weaned onto a mixture of sweet feed and foal pellet through six months of age (table 1). Group 2 (no creep) consisted of 16 foals which were raised under a conventional management system. They were allowed to suckle from their dam until five months of age at which time they were weaned. This group of foals did not receive supplemental "creep" feed until shortly before weaning. Group 3 (creep) consisted of 8 foals which were raised with their dams until 5 months of age. These foals began to receive supplemental "creep" feed at 3 months of age (table 2). Group 4 (nurse) consisted of 8 foals which were raised on foster "nurse" mares. These mares were a mixture of breeds, but were predominately draft and draft crosses.

Foal measurements were taken at 14 day intervals for 168 days. Body weight, withers height, heart girth and cannon bone circumference were monitored.

¹*Mare's Match Foal Milk Replacer, Land O'Lakes, Inc., Fort Dodge, IA 50501*
Guaranteed analysis - crude protein 24%, crude fat 16%

²*Golden Glo Milk Transition Formula, Land O'Lakes, Inc., Fort Dodge, IA 50501*
Guaranteed analysis - crude protein 20%, crude fat 8%, crude fiber 4.5%

This study was supported by a grant from Land O'Lakes, Inc., Fort Dodge, IA 50501

Table 1. Feed intakes of milk replacer foals (group 1)

days of age	fluid milk ¹ intake (cups)	pellet ² intake (lbs)	sweet feed ³ intake (lbs)
5-14	45.2	.57	0
15-28	47.1	.96	0
29-42	45.5	1.39	0
43-56	46.6	1.97	.22
57-70	42.6	2.21	.36
71-84	44.1	3.08	.41
85-98	24.7	4.13	1.13
99-112	0	4.61	1.41
113-126	0	4.48	1.01
127-140	0	4.74	1.03
141-154	0	4.87	1.64
155-168	0	5.0	1.84

¹one quart of fluid milk replacer contains 1/4 lb of dry milk
foals were offered 2 quarts of fluid milk 6 times daily (48 cups/day)
uneaten milk was measured and discarded at each feeding

²Golden Glo milk transition formula

³Woodford Feed, Versailles, KY
crude protein 13.5%, 3.0% fat

Table 2. Feed intake of creep fed foals (group 3)

days of age	Pellet ¹ Intake (lbs)	Sweet Feed ² Intake (lbs)	Total Intake (lbs)
90-120	1.88	.62	2.5
121-150	1.75	1.75	3.00
151-180	0	4.5	4.5

¹Golden Glo milk transition formula

²Farmers Feed Mill, Lexington, KY
16% crude protein, 3.5% fat

Results and Discussion

During the first month, milk replacer foals grew slower than the other three treatment groups (figure 1 and table 3). By the second month of age, the milk replacer group's ADG was similar to the other three groups. At 3 months (84 days), wither height averaged 122.4, 123.9, 123.6 and 126.5 cm in the milk replacer, no creep, creep and nurse foals, respectively (figure 2). Body weights at that time averaged 330.6,

353.9, 369.2, and 397.5 lbs in the milk replacer, no creep, creep and nurse foals, respectively. Milk replacer foals were significantly lighter and nurse mare foals significantly heavier than the other two treatment groups. During the period from 84-168 days of age, ADG was not significantly different between treatment groups. At 168 days, foal body weight averaged 495.9, 522.7, 523.6, and 563.1 lbs in the milk replacer, no creep, creep, and nurse foals, respectively. Nurse mare foals were significantly heavier than milk replacer foals ($p < .05$) while there was no significant difference between the creep or no creep groups and either of the other two groups. Height at 168 days was not significantly different between the treatment groups. Cannon bone circumference from 14-112 days of age was not significantly different. From 126-154 days of age, nurse foals had significantly larger cannon bones than the milk replacer group. However, at 168 days of age, there was no significant difference between treatment groups. Foals raised on nurse mares had significantly bigger heart girths than milk replacer foals throughout the study (figure 3).

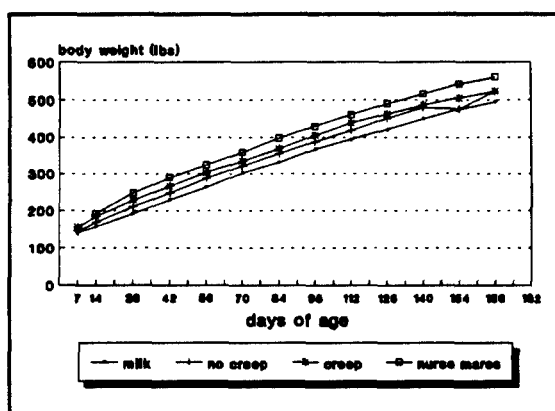


Figure 1. Average body weight (lbs)

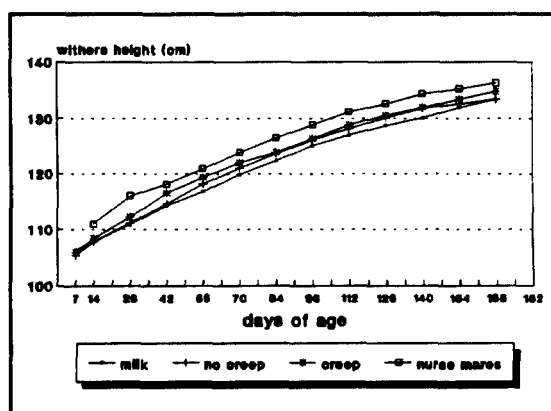


Figure 2. Average withers height (cm)

Table 3. Average daily weight gain (lbs/day)

days of age	milk	creep	no creep	nurse
7-14	2.21 ^a	3.54 ^b	4.20 ^c	--
15-28	2.51 ^{a,b}	2.98 ^{b,c}	3.06 ^c	3.95 ^d
29-42	2.70 ^a	2.67 ^a	2.74 ^a	3.28 ^b
43-56	2.46 ^a	2.86 ^b	2.59 ^{a,b}	2.87 ^b
57-70	2.72 ^a	2.25 ^b	2.32 ^{a,b}	2.48 ^{a,b}
71-84	2.04 ^a	2.45 ^b	2.46 ^{a,b}	2.80 ^b
85-98	2.60	2.33	2.56	2.31
99-112	1.88 ^a	2.31 ^b	2.30 ^b	2.20 ^{a,b}
113-126	1.98 ^{a,b}	2.29 ^a	1.82 ^b	2.20 ^{a,b}
127-140	2.04	2.09	1.79	1.81
141-154	1.89	1.81	1.94	1.81
153-168	2.31 ^a	1.80 ^{a,b}	1.63 ^{a,b}	1.37 ^b

^{a,b}Means in the same row not sharing the same superscript are different ($p < .05$)

Foals weaned at 5 days of age and raised on commercial milk replacer grew slower than conventionally raised foals during the first month of age. During this time, the milk replacer foals received an average of 2.9 lbs of dry milk replacer and 0.8 lbs of milk transition pellet. This equals a total daily intake of 3.7 lbs of feed with an average protein content of 23% and fat content of 13%. Thoroughbred mares during the first month of lactation should produce about 4 lbs of dry matter in their milk with an average dry matter composition of 25% protein and 16% fat. Therefore, the foals fed milk replacer received about 85% as much protein and 75% as much fat as foals nursing their dams. This, combined with the stress of early weaning, probably contributed to the reduced early growth. From 29-168 days, the milk replacer foals grew as rapidly as conventionally raised foals. Height in the milk replacer raised foals was similar to conventionally raised foals throughout the study, and at 168 days both weight and height were not significantly different between milk replacer foals and conventionally raised foals.

Foals that received supplemental feed beginning at 3 months of age (group 3-creep) grew similarly to the group 2 foals which were not given any individual feed until shortly before weaning. Perhaps group 2 foals (no creep) supplemented their diet by stealing from the mare's feed or by increasing forage consumption. Foals raised on nurse mares grew faster than foals raised on milk replacer and were significantly heavier at 168 days of age. It should be noted that the foals raised on nurse mares were first measured at 14 days of age, so it cannot be determined whether they were larger than the other groups of foals from birth. These foals did, however, grow faster than the other groups from 15-42 days of age. While the incidence of developmental orthopedic disease (DOD) was not quantified in these foals, it is interesting to note that 2 of the 8 foals raised on nurse mares had surgery during their first year to repair stifle OCD lesions. None of the other foals in the study required surgery. This lends support to the argument that foals raised on draft and draft cross nurse mares grow faster than foals raised on Thoroughbred mares and that this more rapid growth rate results in a higher incidence of DOD.

In conclusion, foals were successfully weaned at 5 days of age and raised on a commercial milk replacer. Early growth rates were lower than conventionally raised foals because of limitations in dry matter intake and the stress of early weaning, but by six months of age these foals were as tall as conventionally raised foals and only slightly lighter. In the present study, foals were fed 2 quarts of milk replacer 6 times per day. If feeding frequency were increased to 8 or 10 times per day, then additional dry matter could be fed during the first month of age without the scouring problems that may result from larger meal sizes.

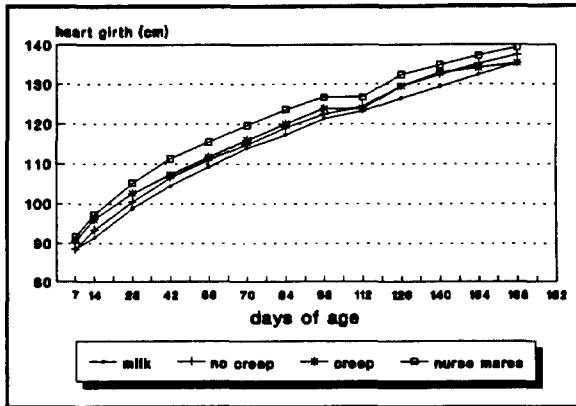


Figure 3. Average heart girth (cm)