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71 Distribution of carbohydrate concentrated feeds in 8 meals/24H during the first winter improves feed efficiency without affecting carbohydrate metabolism nor incidence of osteochondrosis in foals

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Osteochondrosis is a multifactorial pathology that affects up to 75% of equids and impacts their sports career. Feeding excess dietary concentrates, thus inducing increased blood glucose and insulin peaks associated with meals, has been linked to an increased incidence of osteochondrosis in foals. The objective of the study was to analyze the effects of different of concentrate distribution in 2 or 8 meals throughout day and night on glucose metabolism and the incidence of osteochondrosis in foals. Anglo-Arabian foals born to the same sire and bred in the same facilities were used from 6 to 18 mo of age over a 2-year period. At weaning (6 mo), they were housed in stables. After an adaptation period, they received 2.5–3kg of cereal pellets in 2 meals (year 1, 9 females (F) and 10 males (M) and year 2, 5 F and 6 M) or in 8 meals/d (year 1, 10 F, 10 M and year 2, 5 F and 4 M) using an automatic horse feeder (AHF) until 12 mo of age, when the males were gelded and all foals sent to pasture. At 6, 12 and 18 mo, Frequent Sampling Intravenous Glucose Tolerance Tests (FSIVGTT) and joint x-rays were performed. Glucose and insulin FSIVGTT data were analyzed with Bergman minimal model (MinMod software). Data were analyzed using chi2

or linear model test with permutations according to data type. Nutritional intakes per individual were not different in overall terms between year, groups nor sex. Foals receiving 8 meals/day during their first winter had a better average daily gain (562.2 ± 55.0 g/d for 2 meals/d vs 616.1 ± 100.1 g/d for 8 meals/d, $P < 0.01$) and were heavier (307.4 ± 23.4 kg for 2 meals/d vs 314.6 ± 23.2 kg for 8 meals/d, $P < 0.05$) at 12 mo of age. Withers' height, response to FSIVGTT and incidence of osteochondrosis (overall 23.7% of foals with at least one joint affected joint at 18 mo) did not differ between groups. The overall foal response to glucose challenge was higher at 18 mo of age ($P < 0.0001$) and in females ($P < 0.01$). In conclusion, foals' glucose metabolism evolves with age and differs between males and females, as previously described. Feeding concentrated diet 8 times/day does not modify glucose metabolism nor the prevalence of osteochondrosis but slightly increases feed efficiency. Thus, the use of a AHF could provide better foal growth but current data does not support any effect on osteochondrosis.

Keywords: Growth, Cereal, Glucose Metabolism