



## REVIEW &gt;

## Purina® Ultium® Growth and Omolene #300® Horse Feeds Support Optimal Bone Growth and Development

A SUMMARY OF RESEARCH CONDUCTED AT THE PURINA ANIMAL NUTRITION CENTER, EXAMINING THE EFFECTS OF FEEDING YOUNG, GROWING HORSES ULTIUM® GROWTH AND OMOLENE #300® HORSE FEEDS ON BONE DEVELOPMENT.

### < INTRODUCTION >

Sound growth in young horses starts at the earliest stages of development. The formation of strong, properly shaped bones is a function of genetics, management and nutrition. Previous research at the Purina Animal Nutrition Center has established Purina® Ultium® Growth horse feed as a high quality source of nutrition for both young growing horses and lactating broodmares.<sup>1,2,3</sup> In order to investigate the role of nutrition on early bone growth and development, this study evaluated the effects of Purina® Ultium® Growth and Omolene #300® horse feeds on serum concentrations of osteocalcin (OC), a marker of bone formation and carboxy-terminal pyridinoline cross-linked telopeptide region of type I collagen (ICTP), a marker of bone resorption in growing Quarter Horses during the first 2 years of life. In addition, this study utilized serial digital X-ray imaging and joint scoring to analyze the bone development, specifically joint progression, in growing Quarter Horses.

### < MATERIALS AND METHODS >

Eleven Quarter Horse foals (5 fillies, 6 colts) housed in dry lot paddocks and individual stalls were fed either Purina® Omolene #300® (n=5) (16% CP, 5% fat, 6.5% fiber, 29.4% starch, 10.6% WSC, 3.4 Mcal/kg) or Purina® Ultium® Growth (n=6) (15.5% CP, 9.5% fat, 13% fiber, 16.6% starch, 10% WSC, 3.7 Mcal/kg). Foals were creep fed beginning at 28 days of age, starting with 0.23 kg/d and increased by 0.23 kg every 2 days until intake reached 3.6 kg/h/d. Foals consumed grass hay along with their dams and received 1% BW in grass hay post-weaning. Blood serum was collected at birth (d 0) and at 6-week intervals thereafter through 2 years of age and analyzed for OC (Metra Osteocalcin, Quidel Corporation, California, USA) and ICTP (ICTP RIA, Orion Diagnostics, Oulunsalo, Finland). A completely randomized factorial split-plot design tested the effect of diet, sex, and weaning. ANOVA was done with mixed models (SAS 9.2 2010) and least squares means compared with Fisher's LSD (P<0.05). Digital X-ray images were recorded of all distal joints within 48 hours of foaling and then again at 6-week intervals through two years of age. At the same time, joint scoring was conducted by trained and blinded individuals to assess phytitis, joint effusion and angular and flexural limb deformities.

<sup>1</sup>Gordon, M.E., M.L. Jerina, 2010-2015. HR 106, HR 127, HR 137, HR 154, HR 170, HR 179, HR 197.

<sup>2</sup>Vineyard, K.R., M.E. Gordon and M.L. Jerina. 2011. Milk composition in mares fed a fat and fiber-added concentrate. *Journal of Equine Veterinary Science* 31(5):257.

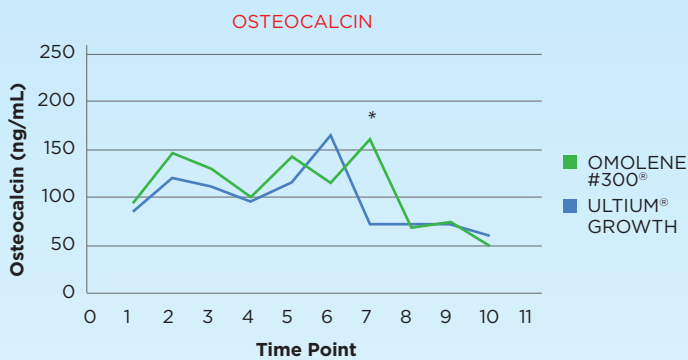
<sup>3</sup>Williamson K.K., M.E. Gordon, M.L. Jerina, M.A. Rao, and R.H. Raub. 2011. Long term use of global positioning satellite to determine factors affecting spontaneous activity in young horses. *Journal of Equine Veterinary Science* 31(5): 239.

## < RESULTS >

Osteocalcin levels were higher in the Omolene #300® group at time point 7, however, there were no other differences due to dietary treatment or sex for OC ( $P=0.60$ ,  $P=0.16$ ; Figure 1) and ICTP ( $P=0.48$ ,  $P=0.10$ ; Figure 2). Further, there were no differences in joint scores between groups at any stage of development (Figures 3). Finally, a board certified veterinary radiologist blinded to treatment reported “There were essentially no changes between the two groups of horses, all of the physes were symmetric and appeared to grow and close at similar times. No OCD lesions were identified in any horse.”

FIGURE 1

Serum osteocalcin measurements (ng/mL) from foals from birth through 2 years of age. \*Only time point 7 is statistically significant at  $P=0.011$ . Time points indicate sampling on a six week interval.



## < IMPLICATIONS >

Nutrition as it relates to sound growth and development in young growing horses is of utmost importance. Purina® Ultium® Growth horse feed has previously demonstrated its ability to produce consistent growth curves when proper feeding management is employed. These data support the use of Purina® Ultium® Growth and Omolene #300® horse feeds in helping to build a strong skeletal framework on which necessary lean tissue, namely muscle, is deposited. Further, information from this study indicate that as part of a proper management plan, Purina® Ultium® Growth or Omolene #300® horse feeds can both help support horses with desirable skeletal traits.

FIGURE 2

Serum ICTP measurements (ug/L) from foals from birth through two years of age. There is higher bone remodeling during the first 18 weeks for both groups ( $P < 0.0001$ ). There are no differences based on dietary treatment. Time points indicate sampling on a six week interval.

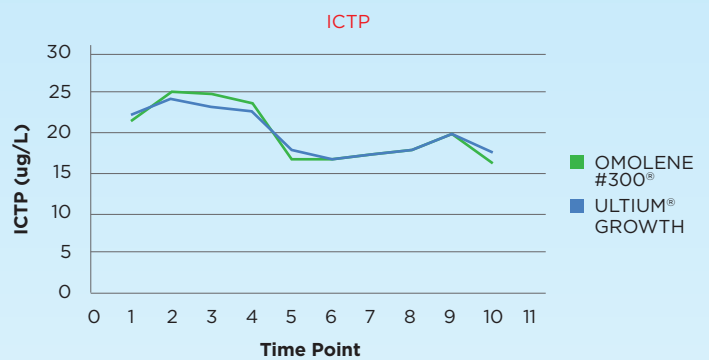
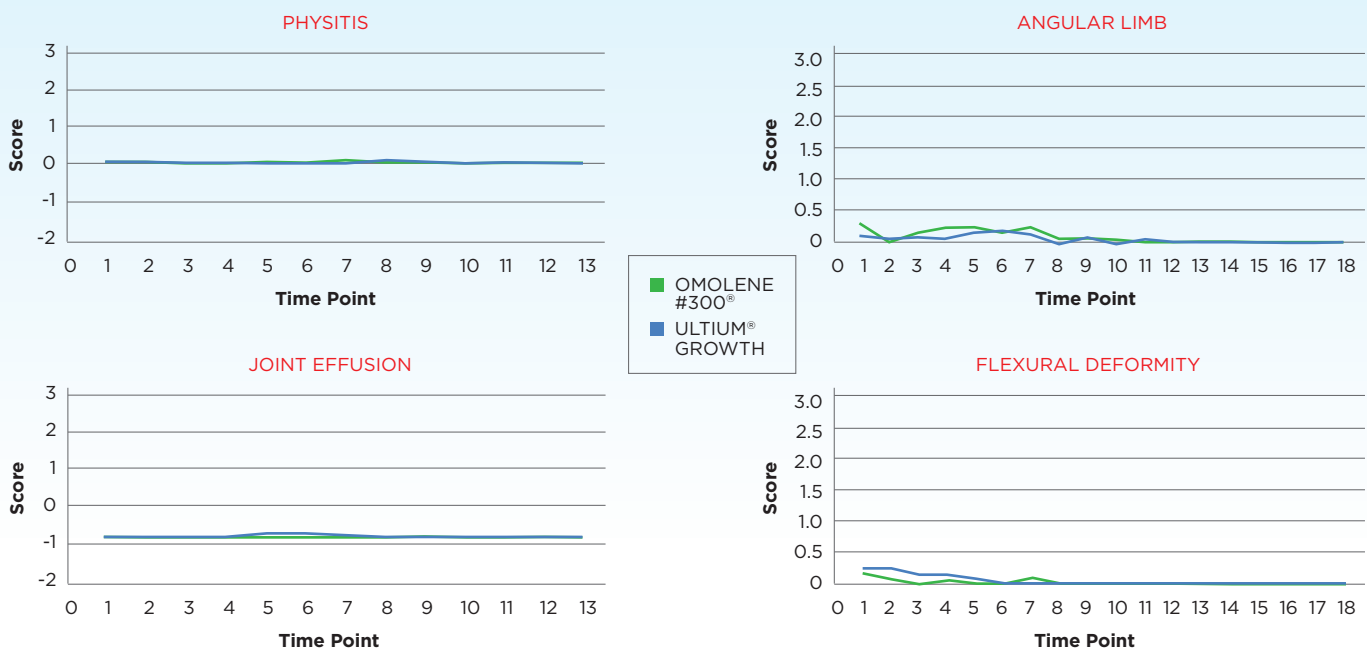


FIGURE 3

Phytitis, Angular Limb, Joint Effusion and Flexural Deformity scoring in foals from birth through 2 years of age. There are no differences based on dietary treatment. Time points indicate sampling on a six week interval.



< FOR MORE INFORMATION > Contact your local Purina representative if you would like more information about this study.