A Pilot Study of the Effect of an Oral Joint Supplement on Gait Kinematics and Biomarkers of Cartilage Metabolism and Inflammation in Mature Riding Horses

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Introduction

Joint degeneration, a debilitating health condition often seen in performance horses, is characterized by a permanent deterioration of articular cartilage often resulting in lameness. Although no proven method of prevention exists, prior research suggests targeted oral supplements may support joint health. Objective means to evaluate lameness or performance characteristics is limited in horses. However, gait analysis software may provide a reliable method to quantify joint movement and fluidity and therefore measure the potential effectiveness of joint health supplements. Biomarkers of cartilage turnover and joint inflammation that are detectable in blood may also provide an objective method of measuring the impact of supplements on joint health.

Materials and Methods

Twenty horses from an established herd at Texas A & M University were randomly assigned to receive either 100 grams of SmartStride Ultra Pellets top-dressed once daily (treatment group, n = 10 horses) or 100 grams of an inactive placebo pellet top-dressed once daily (control group, n = 10 horses) for 28 days. Investigators remained blinded to treatments until completion of data analysis, with treatments coded alphabetically and provided pre-weighed in SmartPaks. All horses were exercised 4 days/week for 45 minutes each day using a progressive workload. On days 13 and 27, all horses participated in a 12-mile exercise stressor in the form of a parade route on a concrete surface, travelling mostly at the walk. On days 0, 14, and 28, kinematic gait analysis was performed on a solid dirt surface to determine range of motion and stride length, and blood samples were drawn to analyze three biomarkers of cartilage metabolism and one biomarker of systemic inflammation.

Results

In summary, an oral joint health supplement was tested in a 28-day experiment using mature stock-type horses undergoing light exercise. Horses in the treatment group significantly increased range of motion of the hock at the walk and tended to increase range of motion at the trot compared to horses in the control group. This finding indicates that the hock may initially be the most sensitive in responding to biomechanical change as a result of oral joint supplementation. The hock is a common area that is sensitive to injury and affected by joint degeneration and thereby supplementing this product may improve comfort and longevity in the mature horse. There was a change in the concentration of serum and plasma biomarkers over time but not between treatments. No change was observed in the concentration of serum or plasma biomarkers. However, further study directly analyzing joint fluid instead of blood, as well as examining additional markers of inflammation, may provide a more detailed understanding of the impact this supplement has on joints. Testing this product in different populations, such as young horses entering performance training, may also be useful in testing its ability to influence joint health. In addition, it is possible that supplementing for only 28 days did not allow sufficient time for the horses' joints to be altered as a result of the compound's uptake.

Hock Range of Motion at the Walk

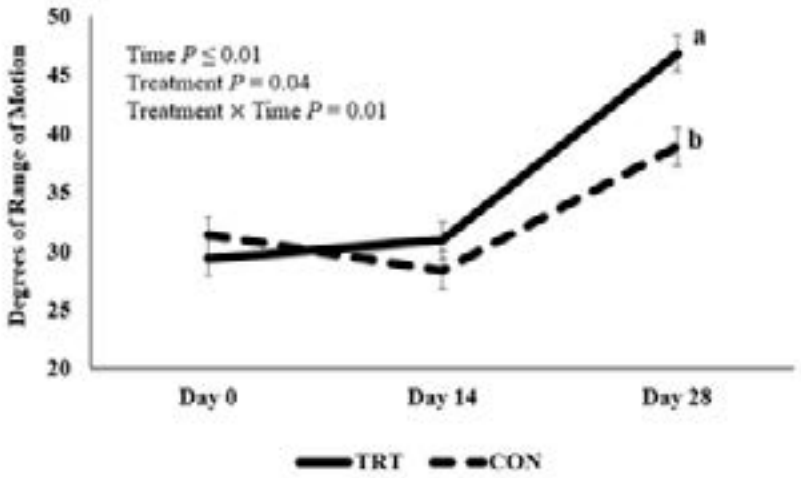

Figure 11. Degree of range of motion of the hock at the walk over time in horses receiving a pelleted concentrate and supplemented with either 100 g of an inactive placebo top-dressed once daily (CON), or an active-ingredient oral joint-health supplement (TRT) containing glucosamine, chondroitin sulfate, hyaluronic acid, methylsulfonylmethane, turmeric, resveratrol, collagen, silica, and boron.
[a,b] Superscripts indicate significant dietary treatment difference $P \leq 0.05$.

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