



BEEF CATTLE RESEARCH UPDATE

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July 2018

Effects of Exercise on the Health and Performance of Beef Calves

Consumers are becoming more concerned about the quality of life for animals. Exercising cattle is a management practice that does not require substantial infrastructure changes or extensive personnel training.¹ It is suggested that such programs might reduce stress, improving cattle performance, and reducing health issues. Exercise may be most effective during periods when cattle are experiencing increased stress (e.g., weaning, arrival in the feed yard), which is associated with negative impacts on productivity. Three recently published experiments have evaluated the effect of exercise on cattle health and productivity.

Texas A&M University researchers evaluated the effects of two exercise regimes on cattle productivity, immune function, and behavior as compared to a control group using 203 weaned crossbred calves during a 28-day trial.¹ Calves were vaccinated against common clostridial and viral pathogens (infectious bovine rhinotracheitis, bovine viral diarrhea type 1 and type 2, parainfluenza type 3, and bovine respiratory syncytial viruses 26 days before weaning and at weaning. The calves were assigned to the treatments and housed in drylots (4 pens/treatment and 16-18 calves/single sex pens). The three treatments were applied 3 times per week for 4 weeks: 1) Control (CON), calves remained in their home pen except for routine husbandry and health purposes, 2) Programmatic exercise (PRO), in which cattle and a stockperson walked in the alleyway behind their home pen for 20 minutes; and 3) Free exercise (FREE), in which cattle were moved into the drovers alley for 60 minutes, not exercised by a stockperson, and were allowed free access to their home pen and alleyway. Calves were fed a growing ration once daily at 6:00 a.m. and all exercise treatments were performed one hour after feeding. Based on infrastructure limitations, only two pens could be simultaneously exercised. Therefore, all exercise sessions were conducted between 7:00 and 10:00 a.m. and the order when each pen was exercised was rotated across days. Live behavioral observations were conducted by two trained observers on days that cattle were not exercised. On days 10 and 28, blood samples were collected and serum was analyzed for antibody titers to bovine viral diarrhea virus type 1b

These researchers reported that no statistical differences were observed ($P = 0.11$) for overall average daily gain (ADG) among cattle receiving FREE (2.20 lb/day), PRO (1.87 lb/day), or CON (1.90 lb/day) exercise treatments. They also noted that comfort-related behaviors (e.g., lying, rumination) increased over the evaluation period, suggesting that calves became acclimated to the environment. Exercise did not influence bovine viral diarrhea virus type 1b antibody titers. They concluded that “exercise did not alter behaviors or vaccine response and did not reduce the performance of production-critical (e.g., feeding, resting, ruminating) behaviors”. The authors also noted that their results “illustrate that different types and intensities of physical activity influence the efficacy of this management practice, because cattle may have perceived the forced continuous activity experienced during PRO as aversive”. Thus, it was suggested if “therapeutic exercise sessions are to be used, they should be short in duration and conducted at a low intensity”.

In an additional Texas A&M University experiment, 688 Brahman-crossbred calves were exercised during the receiving period to examine effect of exercise on cattle productivity, health, and behavior.² Cattle were shipped in the fall to a commercial feedyard in South Texas, sorted into 6 single-sex pens, and pens were randomly assigned to an exercise treatment within sex blocks. The same three treatments previously described were tested: 1) CON, no exercise, 2) PRO; cattle moved to drive alley and encouraged to maintain a movement for 20 min), or 3) FREE; cattle moved to drive alley, and were then allowed free movement without access to the pen for 60 minutes. The

treatments were applied three times weekly (12 sessions) across a 35 day period, between 7:00 and 10:00 a.m. at least 1 hour post feed delivery. Behavioral observations were conducted weekly, prior to treatment implementation and on days that calves were not exercised.

These authors reported that gain to feed ratio ($P = 0.59$; 0.16, 0.14, and 0.15 for CON, PRO, and FREE, respectively) and mortality rate ($P = 0.85$; 1.5, 1.4, and 2.1% for CON, PRO, and FREE, respectively) did not differ among treatments. However, cattle assigned to CON had greater ADG (3.35 lb/day) than FREE or PRO (3.15 and 3.06 lb/day, respectively; $P = 0.03$), and FREE exercised cattle tended ($P = 0.07$) to have greater ADG than PRO. The percentage of calves treated for respiratory disease did not differ among treatments. As reported in the first Texas A&M experiment, across treatments, calves spent more time lying ($P = 0.04$) and resting ($P < 0.01$), and less time feeding ($P = 0.03$), drinking ($P = 0.01$), ruminating ($P < 0.01$) and walking ($P < 0.01$) as the receiving period progressed. These researchers concluded that exercise treatments did not compromise feed efficiency or cattle behavior; however, exercised cattle had lower ADG suggesting that exercise reduces receiving period gains without improving animal health or altering behaviors.

Oklahoma State University researchers recently conducted an experiment to determine the effects of exercise on receiving calf health and performance during a 56-day receiving period using.³ In this experiment, 94 head of 550 lb steers were either exercised or not exercised over the receiving period. Exercise consisted of walking 3 days per week (Monday, Wednesday, and Friday) at approximately 5:30 a.m. (before the morning feed delivery) for a distance of ~0.33 miles at an average walking speed of 2.23 miles per hour, resulting in approximately 10 minutes of exercise. Exercise was conducted by walking behind the calves on foot with no verbal communication or driving aids in an attempt to minimize stress.

The effects of exercise on calf performance and health are shown in Table 1. No differences in body weight or ADG due to exercise were observed. The exercised calves were more efficient compared with non-exercised calves during the overall 56 day trial ($P = 0.02$). Across treatments, 35.1% of the steers were treated at least once for clinical signs of bovine respiratory disease (BRD). The number of calves that required a second antimicrobial treatment for BRD tended ($P = 0.08$) to be reduced for non-exercised calves compared with exercised calves. These researchers concluded that this “experiment suggests that moderate routine exercise conducted in a low stress manner could potentially improve feed conversion efficiency during the receiving period”.

Table 1. Effect of exercise on calf performance and health over 56 days.

Item	No Exercise	Exercise	P-value
Initial BW, lb	549	551	0.74
Day 56 BW, lb	784	786	0.68
ADG	4.18	4.20	0.83
DMI, lb	19.78	18.73	0.12
Gain:Feed	0.213	0.226	0.02
1 st antimicrobial treatment, % ¹	31.4	36.5	0.45
2 nd antimicrobial treatment, % ²	4	14	0.08
3 rd antimicrobial treatment, % ³	0	4	0.11
Total antimicrobials, % ⁴	35.4	54.5	0.11

¹ 1st antimicrobial treatment = % of calves receiving an antimicrobial treatment.

² 2nd antimicrobial treatment = % of calves receiving a 2nd antimicrobial treatment out of calves receiving an initial antimicrobial treatment.

³ 3rd antimicrobial treatment = % of calves receiving a 3rd antimicrobial treatment out of calves receiving a 2nd antimicrobial treatment.

⁴ Total antimicrobials = total number of antimicrobial treatments administered as a % of calves.

Adapted from Woolsoncroft et al., 2018

In conclusion, results from the two Texas studies illustrate that different types and intensities of physical activity influence the efficacy of exercise in a management program. All three studies

suggest that if exercise session are to be used, they should be short in duration and conducted at a low intensity. There were negligible differences in calf health due to exercise. Further research is needed to determine the effects of exercise on cattle health before recommending changes in husbandry and animal management.

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- ¹ Daigle, C. L., B. Jackson, R. Gill, T. A. Wickersham, and J. E. Sawyer. 2017. Impact of exercise on productivity, behavior, and immune functioning of weaned *Bos indicus*–cross calves housed in drylots. *J. Anim. Sci.* 95: 5230-5239.
 - ² Ridge, E. E., A. J. Mathias, R. Gill, T. A. Wickersham, J. E. Sawyer, and C. L. Daigte. 2018. Effect of exercise on calf productivity, health and behavior. In: 2018 Plains Nutrition Council Spring Conference, San Antonio, TX. p. 131 (Abstr.).
 - ³ Woolsoncroft, M. A., M. E. Youngers, L. J. McPhillips, C. G. Lockard, C. L. Haviland, E. S. DeSocio, W. R. Ryan, C. J. Richards, and B. K. Wilson. 2018. Effects of exercise and roughage source on the health and performance of receiving beef calves. *Prof. Anim. Sci.* 34: 183-191.

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