# Effect of Age at Castration on Beef Calf Performance

**Amie Imler, Todd Thrift, Matt Hersom, Joel Yelich[1]**

Timing of castration in nursing calves did not impact weaning weight or other economically important growth measures from birth to weaning. Delaying castration until calves were older (approximately 131 days of age) did not result in heavier weight calves at weaning.

***Summary***

*The objective of this study was to determine if timing of castration in nursing calves affected calf performance, primarily weaning weight. Ninety-two calves were assigned to one of two castration treatments, early (average age at castration 36 d) or late (average age at castration 131 d). Calves were stratified to treatment by birth date, breed (Angus or Brangus), and cow age. All calves were surgically castrated using the Newberry knife to incise the scrotum and traction to remove the testes. Birth weight was similar between early and late castrates at the onset of the experiment. Actual weaning weight, adjusted 205-d weaning weight, and body weight change throughout the experimental period were all similar between early and late castrate treatments. Brangus calves tended to be heavier at weaning and had significantly heavier adjusted 205-d weaning weights compared to Angus calves in the study. However, there was no breed by castration interaction between early and late castration treatments for any of the measurement points. This study suggests that delaying castration until calves were more advanced in age was not advantageous to increasing weaning weight.*

## Introduction

Castration is a common management practice within the United States beef industry. Traditionally, steers have held a distinct advantage in the market place over their intact contemporaries because of their ability to fit within modern beef production systems and produce a more desirable carcass for consumers (Bretschneider, 2005). Although intact males will gain more efficiently and produce a greater red meat yield than steers (Arthaud et al., 1969), their aggressive behavior and reduced carcass quality create a need for bull calves to be castrated prior to weaning.

Although the practice of castration is widely utilized within the industry, the timing and method utilized for castration can vary considerably from operation to operation. Factors that may impact timing of castration include producer philosophy, product marketing claims, weather, and availability of resources such as facilities or labor. Some cattlemen believe that delayed castration can improve growth factors in nursing calves. This belief is also endorsed by some product manufacturers who claim that delayed castration can create significant weight gain advantages at weaning compared to calves that were castrated at or near birth. Since producers are paid on a pounds basis and most cattlemen opt to market their calves at weaning, differences in weaning weight can mean differences in profitability.

Despite the perceived benefits of delayed castration, studies have shown that both light-weight and yearling calves castrated post-weaning have significantly reduced feedlot performance and health compared to calves that were purchased as steers (Brazle, 1992; Berry et al., 2001; Knight et al., 1999). Additionally, there is evidence that castration elicits a greater stress response in older calves than in calves that

[1]Department of Animal Sciences, University of Florida, Gainesville, FL

were castrated at or near birth (Stafford and Mellor, 2005). As the principles of animal welfare and the economics of efficiency become increasingly more of a focus within the beef industry, producers may find that the supposed benefits of delayed castration are far outweighed by its drawbacks.

The objective of this study was to determine if age at castration resulted in significant differences in weaning weight and growth rate in nursing calves. In addition, comparisons between Angus and Brangus calves were made between treatment groups to determine if there was a breed by castration effect.

**Materials and Methods**

Ninety-two intact Angus and Brangus bull calves were utilized in the study. Calves were born between December 18, 2009 and March 28, 2010. Calves were stratified by birth date, breed (Angus or Brangus), and cow age (first-time heifer or cow), paired, and then randomly assigned to one of two treatment groups, early (n = 51) and late (n = 42) castrates. All calves were surgically castrated using the Newberry knife to incise the scrotum and traction to remove the testes. Early castrates (Angus n = 23; Brangus n = 28) were 36 d of age on average (range 3 to 73 d of age) at time of castration (March 1, 2010 and April 23, 2010). Late castrates (n = 15 Angus; n = 26 Brangus) were 131 d of age on average (range 84 to 180 d of age) at time of castration (June 16 and June 17, 2010). At the time of castration, average body weight of the late castrate treatment group was 356 $\pm$ 10.7 lb. All calves were weighed monthly beginning in May until weaning in August. The experiment took place at the University of Florida Boston Farm-Santa Fe River Ranch Beef Research Unit. Cow-calf pairs had ad libitum access to hay with co-product supplement during the winter months (December 2009 through April 2010), and were maintained on bahiagrass (*Paspalum notatum*) pasture throughout the remainder of the trial period.

**Statistical Analysis**

The experiment was designed as a completely randomized design, with castration treatment, breed, and breed by treatment as the fixed effects, steer within treatment as the random effect and individual calf as the experimental unit. Data were analyzed using the Mixed procedure of SAS v9.2. Means were calculated using the least squares means, and means were separated using the P-diff option when the overall F-value was <0.10.

**Results**

At the initiation of the trial, calf birth weights (Table 1) were similar among castration treatments ($P$ = 0.83). However, Brangus calves tended ($P$ = 0.07) to be heavier at birth than Angus calves. At the conclusion of the trial, weaning weight averaged 454 $\pm$ 11.4 lbs. Although there were no differences among treatment groups ($P$ = 0.76), Brangus calves tended ($P$ = 0.06) to be heavier at weaning than Angus calves. In addition, weight per d of age at weaning and adjusted 205-d weaning weight were similar ($P$ > 0.24) among treatments. Brangus calves had significantly greater adjusted 205-d weaning weights compared to the Angus calves ($P$ = 0.01). There was no breed by castration interaction between early and late castration treatments for any of the measurement points in this study, which suggests that the effect of time at castration was not different for the two breeds utilized.

No differences were observed in body weight change and average daily gain (Table 1) during the trial period ($P$ > 0.19). When comparing calf body weights for the month of May (Figure 1), no differences were observed between the early and late castration treatments ($P$ = 0.98). This implies that calves castrated at or near birth had overcome any growth delays related to castration by the time body weight measurements were initiated. Additionally, early castrates did not seem to experience any significant disadvantage in growth due to treatment throughout the trial period.

Since both early and late castration treatments were performed prior to weaning and the onset of puberty, these results would seem reasonable. The concept underlying delayed castration is to leave male calves intact long enough to capture the benefits of endogenously secreted androgens that are known to stimulate growth in animals

(Gortsema et al., 1974). However, to capture the full benefit, castration would most likely need to be delayed until calves were post-pubertal. It is only at this point that calves would have the ability to secrete enough endogenous testosterone to create significant differences in weight and growth performance. The comparable pubertal status of the treatment groups in this study likely contributed to the similar weaning weights and growth measures between the early and late castrates.

In conclusion, no differences in early and late castration were observed. Calf performance results from this trial and others indicate that producers have some degree of flexibility in determining when to implement castration. Producers should recognize that castration at or near birth will not have a detrimental effect on calf performance or ultimate weaning weight. Equally important, producers should also realize that delaying castration until calves are approximately 131 d old will not bring added weight at weaning despite some producer philosophies and marketing claims that endorse such management practices.

**Literature Cited**

Arthaud et al. 1969. J. Animal Sci. 28:742.
Berry et al. 2001. http://www.ansi.okstate.edu/research/2001rr/21/21.htm.
Brazle. 1992. Pages 80-82 in Kansas State University Cattleman's Day Report.
Bretschneider. 2005. Livestock Production Sci. 97:89.
Gortsema et al. 1974. J. Animal Sci. 39:680.
Knight et al. 1999. N. Z. J. of Agri. Res. 42:255.
Stafford and Mellor. 2005. N. Z. Vet. J. 53:271.

**Table 1:** The effect of age at castration on calf growth performance

| | Treatment[1] | | | |
|---|---|---|---|---|
| Item | Early | Late | SE[2] | P-value |
| Birth weight, lb. | 80 | 81 | 2.4 | 0.83 |
| Weaning weight, lb. | 456 | 452 | 11.5 | 0.76 |
| Weight per day of age, lb. | 2.44 | 2.35 | 0.06 | 0.24 |
| Adjusted 205-d weaning weight, lb. | 512 | 504 | 8.9 | 0.51 |
| Body weight change, lb. | | | | |
| May to June | 77 | 75 | 4.7 | 0.79 |
| June to July | 86 | 82 | 3.6 | 0.40 |
| July to August | 100 | 96 | 4.3 | 0.55 |
| May to August | 176 | 171 | 5.9 | 0.49 |
| Birth to weaning | 376 | 371 | 10.8 | 0.71 |
| ADG[3], lb/d | | | | |
| May to June | 2.32 | 2.27 | 0.14 | 0.79 |
| June to July | 2.06 | 1.96 | 0.09 | 0.39 |
| July to August | 1.65 | 1.59 | 0.07 | 0.54 |
| May to August | 1.88 | 1.82 | 0.06 | 0.49 |
| Birth to weaning | 2.00 | 1.92 | 0.05 | 0.19 |

[1] Early Castrated (average age at castration = 36 d) Late castrated (average age at castration = 131 d)
[2] Standard error (n = 92)
[3] Average daily gain

**Figure 1:** Effect of castration timing on calf body weight in May