WELFARE CONSIDERATIONS

* **Pain:**  Stafford KJ in the article “Alleviating the pain caused by the castration of cattle” stated that all physical methods of castration cause pain. Animals exhibit pain responses during and after castration; these responses include struggling, kicking the hind legs, tail swishing, foot stamping, head turning, restlessness, stilted gait, reduced activity, increased recumbency, abnormal standing posture, reduced interest in dams and each other and reduced grazing and feed intake. In the article “Effect of different methods of castration on behaviour and plasma cortisol in calves of three ages” by Robertson IS and Kent JE, Molony V the effect of age on response to castration was investigated: One- to seven-day old calves castrated using elastrator rings exhibited few behaviors associated with pain or distress, and plasma cortisol concentrations of castrated calves did not significantly differ from those of uncastrated controls. Although 6-day-old bull calves exhibited fewer violent pain responses than 21- or 42-day-old calves after castration, pain-associated behaviors were observed in all groups.Forty-two-day-old calves exhibited a high incidence of pain-associated behaviors and a marked increase in plasma cortisol concentration, possibly indicating these animals experienced more pain than 6- or 21-day-old calves. Supporting the value of early castration, it has been found that beef calves castrated before weaning ate more and had higher average dail gain (ADG) with lower inflammatory responses in the 14 days after castration than calves that were castrated after weaning.
* **Physiological Stress:** Surgical castration appears to produce the most substantial rise in plasma cortisol concentration. Application of the Burdizzo clamp may also be associated with a similar, rapid rise in cortisol concentration due to the barrage of afferent neural impulses during and after crushing of the spermatic cord and scrotal nerves. Chase et al observed that plasma cortisol concentrations increased immediately after surgical castration; animals that were banded had cortisol increases of less initial intensity, but the concentrations were similar for both procedures on the second postoperative day.
* **Disease:** La Fontaine D in the article “Dehorning and castration of calves under six months of age” stated that castration-associated immunosuppression may increase risks of local or systemic disease after the procedure.  Murata in the article “Effects of Burdizzo castration on peripheral blood lymphocyte parameters in calves” observed significant reductions in circulating white blood cells and T-lymphocyte function and significnt increases in total white blood cell count and neutrophil count in 3- to 4-month-old bull calves castrated using a Burdizzo clamp; values returned to baseline by 7 days after surgery. Surgical castration causes increased haptoglobin and decreased gamma-interferon production. Haptoglobin exerts a suppressive effect on lymphocyte function, and reduction of gamma-interferon results in suppression of the immune system’s cell-mediated immunity and response to antigens. Studies indicate that castration-associated leukocyte depression may be limited or eliminated by pre-surgical administration of a local anesthetic and a systemic analgesic. The wound associated with surgical castration is at risk of infection. Clostridial organisms, ubiquitous in soil, may enter the wound and result in local or systemic infection; clostridial vaccination prior to castration is recommended. Use of rubber rings in calves older than 6 months may be associated with increased risks of tetanus or other infection.
* **Performance:** Fisher et al in the study entitled “Effect of castration method and the provision of local anesthesia on plasma cortisol, scrotal circumference, growth, and feed intake of bull calves” observed that surgical castration of 5.5-month-old calves resulted in reduced ADG for the first 7 days after surgery, but calves to which local anesthetic had been administered before castration exhibited higher ADG for the same period when compared with calves undergoing surgery alone. Calves castrated using Burdizzo clamps exhibited ADG similar to control calves for the first 7 days, but ADG was reduced from the 15th to the 21st days after surgery. Surgical castration of 6- to 9-month-old bull calves reduced daily weight gain and feed intake. No effect of castration was observed on overall growth of 1.5- to 5.5-month-old calves for 42 days after castration using a Burdizzo clamp.