

Castration of Beef Calves: Best Practices & Considerations

A Guide for Beef Cattle Producers

Definitions

- **Analgesic:** A drug that temporarily eliminates or reduces pain, but not normal sensation or awareness.
- **Anesthetic:** A drug that temporarily eliminates the feeling of pain. Local anesthetics (e.g., lidocaine) cause numbness in the area it's applied, while general anesthetics (e.g., xylazine) cause sedation or unconsciousness.
- **Banding:** A castration technique that uses an elastrator to stretch and position a rubber band around the neck of the scrotum above the testes.
- **Belly nuts:** When an animal is only partially castrated because of an incorrect banding technique. It occurs when one or both testicles is pushed upward into the body cavity, and the banding ring is placed below them.
- **Burdizzo:** A clamp that crushes the spermatic cord while the scrotum remains intact.
- **Emasculator:** An instrument that crushes and cuts the spermatic cord simultaneously and prevents hemorrhage as it detaches the testis from the animal.
- **Non-steroidal anti-inflammatory drug (NSAID):** A type of analgesic medication (e.g., flunixin meglumine) used to control pain and swelling for a variety of conditions.

Castration is a common management practice in the beef industry. It is performed primarily to reduce aggressive behavior and improve the marbling and tenderness of the finished beef, which improves calf marketability.

Castration Techniques

Surgical Castration

- ☐ Preferred method of castration.
- ☐ Removes the testicles by opening the scrotum and severing the spermatic cord in a manner that minimizes bleeding with an **emasculator** or by stretching the cord until it breaks.



Surgical Castration (Continued)

☐ Emasculator:

- An instrument that crushes and cuts the spermatic cord simultaneously. It prevents hemorrhage as it detaches the testis from the animal.



Image 1: Example of an emasculator. Credit: Wikimedia Commons, User Daderot

Bloodless Castration

☐ Burdizzo:

- A clamp used to physically crush the spermatic cord through the scrotal skin. This disrupts the testicular blood supply and causes the testes to die. The scrotum remains intact, while the testes eventually shrink down, sterilizing the animal.
- This technique is becoming less common in the cattle industry. It has a higher failure rate (up to 35%), particularly with old or poorly maintained equipment.

☐ Banding

- Uses an elastrator to place a heavy elastic band around the neck of the scrotum, with both testes inside.
 - LidoBand™ is a latex rubber band infused with 80g of lidocaine which provides local anesthesia to the application area for up to 42 days according to the manufacturer.
- Complications: **Belly Nuts**
 - Incorrect application of rubber bands in calves can result in “belly nuts,” which is a semi-castration of only one testicle.
 - These calves often present at feedlots with one testicle intact, usually sitting up against the body.
 - Belly nuts pose significant challenges in the feedlot. They can impact economic outcomes through labor requirements and mortality rates, and raise animal welfare concerns.
 - Correction of this condition requires a second surgical castration, which has a higher risk of infection or death from blood loss.



Image 2: Example of castration rings/bands. Credit: G. Maier



Castration Age

- ☐ Castration of calves can be done at any age, but castration before 3 months of age leads to fewer complications compared to later castrations.
- ☐ Advantages of early castration include:
 - Easier to handle and restrain calves
 - Decreased pain and discomfort
 - Less bleeding and risk of infection
 - Reduced weight loss and improved carcass quality
- ☐ Research shows that waiting to castrate calves until weaning does not provide a lifetime performance advantage.

Research findings indicate that calves castrated upon arrival at the feedlot had a 17% to 58% higher risk of disease compared to steers that were castrated at a younger age prior to arrival. [Carter 2011]

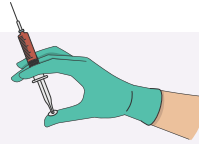


Pain Management

- ☐ All methods of castration result in pain
 - Surgical castration causes a higher level of pain that lasts for a few days.
 - Banding castration induces a milder pain that can last over a month.
- ☐ Timing is Key 
 - Local anesthetics need to be injected 5 to 20 minutes before the castration, to provide several hours of pain relief.
- ☐ Once is not enough! 
 - A single dose of NSAIDs does not last long enough to eliminate all the pain symptoms associated with castration.



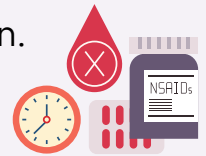
☐ Local Anesthetics + NSAIDs



- Studies show that use of a local anesthetic (e.g., lidocaine) is enhanced by the co-administration of an NSAID (e.g., flunixin meglumine or meloxicam).
- The combination can provide superior pain relief compared to the use of one of the drugs alone.

☐ NSAIDs take longer to take effect but have a longer duration of action.

- Meloxicam can take 12 hours to reach full effect but can last up to 48 hours.
- Flunixin Meglumine has a more rapid onset of action but lasts less than 24 hours.
 - The novel formulation of Banamine® Transdermal (flunixin meglumine transdermal solution) is associated with a reduced stress response for 8 hours when given at the time of castration ([Kleinhenz et al., 2018](#)).



- ☐ Producers should consult their veterinarian for the best method of pain management during and after castration.

Precautions for Castration

Watch the Weather

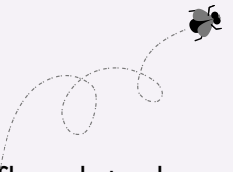


- ☐ Avoid castration during the hot summer months to reduce the risk of fly-related infections and problems.
- ☐ Avoid castrating on cold, wet, or muddy days to reduce the risk of bacterial infections.

Be Aware of Tetanus



- ☐ Castration increases the risk for tetanus infection, especially when bands are used.
 - Tetanus is a serious bacterial infection caused by *Clostridium tetani*, an organism that is found in the soil and environment.
 - The death rate can be as high as 80% in calves ([University of Calgary](#))



☐ Consult your veterinarian about a tetanus vaccination protocol before castrating your calves.

☐ Tetanus Toxoid Vaccine

- A vaccination that provides long term protection prior to castration.
- Two doses required
 - The 2nd dose is ideally given at least 2 weeks prior to castration



☐ Tetanus Antitoxin

- Recommended by many veterinarians on the day of castration; speak with yours.
- Provides protection for 10 - 14 days, after which tetanus toxins from banding can still develop. Can be combined with vaccination; consult your veterinarian for a protocol.

Minimize Infection Risk



- ☐ Only use sterile or disinfected instruments.
- ☐ Sanitize instruments between testicles and between calves.
- ☐ Thoroughly clean and disinfect all surgical equipment after castration.
- ☐ Store equipment in a clean, dry place.



Excessive Bleeding



- ☐ Excessive bleeding can be stopped by applying a tight knot around the neck of the scrotal stump for an hour with umbilical tape.
 - A clean (unused) shoelace can be used if umbilical tape is unavailable.
 - The build-up of pressure will lead to blood clot formation.
 - If unsuccessful, call your veterinarian.






Image 2: Example of a clean, unused shoelace.

Conclusion

- ☐ Calves should be castrated as young as possible to minimize the pain associated with castration.
- ☐ Surgical castration is preferable to banding unless calves can be banded within a week of birth.
- ☐ Regardless of castration method, proper techniques and tool sanitation are crucial to minimize infection.
- ☐ Pain management, utilizing different drugs at different times, is essential for animal welfare.
- ☐ Vaccination against tetanus and other clostridial diseases can prevent deadly infections and complications after castration of calves.

Additional Resources

- **Video: How to castrate bull calves**
 - <https://tinyurl.com/HowToCastrateBullCalves> 
- **Read: "Don't Forget Tetanus Prevention when Banding Bulls!"**
 - <https://tinyurl.com/TetanusPrevention> 
- **Video: Watch a webinar that discusses different castration methods and the difference between using local anesthetic or NSAIDs for pain control.** *Note: this video was made in Canada, thus not all drugs may be available in the U.S.*
 - <https://tinyurl.com/CastrationandPainControl> 

CDFA Antimicrobial Use and Stewardship | www.cdfa.ca.gov/ahfss/aus

UC Agriculture and Natural Resources | <https://ucanr.edu/site/newborn-beef-calf-health>

This document was made in collaboration with the following organizations:

