



Castration of Beef Calves: Best Practices and Considerations

A Guide for Beef Cattle Producers



Definitions:

Emasculator: Crushes and cuts the spermatic cord simultaneously, preventing hemorrhaging while still detaching the testis from the animal.

Burdizzo: A clamp that is used to physically crush the testicular 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.

Banding: Uses an elastrator to stretch the rubber band while the it is positioned around the neck of the scrotum above the testes.

Belly nuts: A condition that occurs due to the incorrect application of a rubber band during castration. It is caused by one or both testicles being pushed upward into the body cavity, with the ring placed below them. These calves usually present at feedlots with one testicle intact, sitting up against the body. Belly nuts pose significant challenges in the feedlot, impact economic factors, labor efficiency, mortality rates, and raise concerns related to animal welfare. Correction of this condition requires a second castration, which comes with a higher risk of infection or death from blood loss.

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

Castration Techniques:

SURGICAL 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.

BLOODLESS CASTRATION

- Burdizzo:**
 - Crushes the spermatic cord while the scrotum remains intact by using an instrument called Burdizzo.
 - 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**
 - Banding places a heavy elastic band around the neck of the scrotum with both testes inside through using a special tool called an elastrator.
 - For example: LidoBand™ is a latex rubber band designed to be placed around the base of the scrotum of calves for castration.
 - Each band is infused with 80 mg of lidocaine, which provides local anesthesia to the application area lasting up to 42 days.
 - This method is rapid in young animals and has a low failure rate (5%). However incorrect application of rubber bands in calves can result in semi-castration of only one testicle (“belly nuts”) so it is important to check whether both testicles are below the band.

Definitions:

Anesthetic (e.g., lidocaine): A drug that temporarily eliminates the feeling of pain. Local anesthetics cause numbness; general anesthetic cause unconsciousness. Anesthetics need to be injected 5 to 20 minutes before the castration to provide several hours of pain relief.

Analgesics or Non-steroidal Anti-inflammatory Drug (NSAID): Temporarily eliminate pain, but not normal sensation. Analgesics provide some pain relief for up to a day after castration. NSAIDs control swelling and pain for a variety of different conditions; although one-time injection products do not last long enough to eliminate all the symptoms associated with band castration. The time for NSAIDs to take effect is longer compared to local anesthetics, but their duration of action is longer. For example, meloxicam takes up to 12 hours to reach full effect but lasts up to 48 hours. This contrasts with flunixin, which acts rapidly but has a duration of action of under 24 hours. Experimental Studies have shown that local anesthetic action is enhanced by co-administration of an NSAID.

Castration Age:

- Castration of calves can be done at any age, but castration before 3 months of age is less painful, less traumatic, and leads to fewer complications than later castrations.
- Research shows that there is no lifetime performance advantage to waiting to castrate calves until weaning.
- There is a risk of negatively impacting calf health and welfare, and carcass quality by delayed castration.
- Advantages of early castration include:
 - Less pain and discomfort
 - Easier to handle and restrain
 - Less bleeding, infection, and less weight loss
- 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.

Pain Management:

- All methods of castration result in pain. Surgical castration inflicts a higher level of pain lasts for a few days, whereas banding castration induces a milder but chronic pain that lasts over a month.
- Managing pain in cattle has become a public concern, therefore producers are recommended to consult with their veterinarians on the best methods to manage pain during and after castration.
- Administration of local anesthetics (e.g., Lidocaine) plus non-steroidal anti-inflammatory drug (e.g., Flunixin meglumine or Meloxicam) mitigate the pain associated with castration.

- The novel formulation of Banamine® Transdermal (flunixin transdermal solution) is associated with less stress response for 8 h when given at the time of castration (Kleinhenz et al., 2018). However, a prescription from your vet is required to use transdermal Banamine.

Proper Restraint for Castration:

- Calves that are under 36 hours old can be easily restrained in the pasture, positioned on their side, and then castrated by a single individual using a short piece of rope (Marianna et al. 2017)..
- Older calves often require two people for restraint.
- Depending on the size, heavier calves require a calf or squeeze chute with the calf standing in a chute and the tail held up over the back for restraint (AABP guidelines).

Precautions for Castration:

WATCH THE WEATHER

- Avoid castration during the hot, summer months due to fly problems and related infections.
- Avoid castrating on cold, wet, and muddy days to avoid bacterial infections.

BE AWARE OF TETANUS

- Banding:**
 - Castration increases the risk for tetanus infection, especially when bands are used.
 - Consult with your veterinarian for a tetanus vaccination to use before castrating your calves.
 - This can be achieved through the administration of tetanus toxoid (two doses required with the second ideally given two weeks prior to castration).
 - Some veterinarians recommend using tetanus antitoxin on the day of banding, but protection only lasts for 10 – 14 days and tetanus toxins from banding can develop later than that.

MINIMIZE INFECTION RISK

- Use only 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.

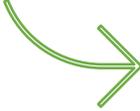
BANDING CONCERNS

- Producers who use the banding method should become familiar with the various instruments used to apply bands, and how to use them and make sure both testicles are below the band to avoid the problem of so-called belly nuts.
- Excessive bleeding can be stopped by applying a tight knot around the neck of the scrotal stump for an hour with umbilical tape or a shoelace if umbilical tape is unavailable. The pressure build-up will lead to blood clot formation. If unsuccessful, call your veterinarian.

Conclusions:

- 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 surgical techniques and tool sanitation are crucial to minimize infection.
- Any calf castrated with an elastrator band should be given tetanus prevention in the form of either tetanus toxoid (two doses required with the second given two weeks prior to castration), tetanus antitoxin (given the day of banding) or, in some cases, both are used concurrently or sequentially.
 - The effect of tetanus antitoxin only lasts for up to 14 days and may be insufficient to prevent tetanus if given on the day of banding.

- Tetanus vaccination is recommended at castration and banding, for example Ultravac®, Covexin®, or Cavalry® vaccines are used to prevent the major life threatening clostridial diseases that commonly occur in cattle including tetanus and black leg.
 - Ideally, the first dose is administered prior to castration and banding with a booster at the procedure.



Additional Resources:

Watch video on how to castrate bull calves:

<https://www.youtube.com/watch?v=NirjTncYmVM>

Read “Don’t Forget Tetanus Prevention when Banding Bulls!

<https://u.osu.edu/beef/2018/03/21/dont-forget-tetanus-prevention-when-banding-bulls/#:~:text=Any%20calf%20castrated%20with%20an,are%20used%20concurrently%20or%20sequentially.>

Watch webinar discusses the difference between using local anesthetic or NSAIDs for castration pain control, and different methods of castration. Note: this video was made in Canada and not all drugs may be available in the U.S.

<https://www.youtube.com/watch?v=EkJz43HcodY&t=435s>

This document was made in collaboration with the following organizations:

