TOPICS TO COVER

• Current ideas and methods for bovine dehorning
• Current ideas and methods for bovine castration
• Pain medication for both dehorning and castration
CATTLE DEHORNING

• Necessary management practice to reduce injury to animals and handlers
• The younger the calf, the less painful and invasive
• The AVMA and AABP recommend dehorning at the earliest possible age
DISBUDGING VS. DEHORNING

• Disbudding is the act of removing the horn in calves less than 2 months of age
  - preferred by the AVMA

• Dehorning requires cutting out the horns and horn-producing tissue from the skull
MINIMIZING STRESS AND PAIN

• It is generally recommended that if cattle are one year of age or older, local anesthesia and possibly general sedation are warranted.

• Dehorn cattle as early as possible to decrease stress associated with this procedure.

• Breeding for polled genetics is the long term goal.
AGE

Dehorning and castration is best done when the calf is young and should be done at the youngest age prudent within the management scheme. Both procedures may be achieved as early as the first 24 hours of life, while in some systems, in order to minimize stress from repeated handling, the procedure may be delayed.
DOING IT WRONG
**RESTRRAINT**

Calves should be restrained for dehorning and castration in a way that minimizes stress and the risk of injury to the calf and the operator.

- Chemical restraint may be used to minimize stress and increase ease of handling.
- Mechanical: Employees should be trained on safe, low stress handling and provided the time and resources necessary to achieve this type of handling. The use of a squeeze chute, tilt table, calf cart or halter may accomplish proper head restraint.
RESTRAINT FOR DEHORNING
Butane fueled hot iron

EQUIPMENT FOR DEHORNING SMALL CALVES
Caustic paste may be used for dehorning and is used most effectively within the first two days of life. When using caustic paste, care must be taken that the calf will not rub the paste onto either its dam or other herd-mates, and will be protected for at least 24 hours from rain or other moisture that may cause the paste to run. For detailed instructions on using paste to dehorn visit http://ans.oregonstate.edu/sites/ans.oregonstate.edu/files/extension/cattle/DehornCalvesPaste.pdf
Dehorn calves with paste

A. Villarroel

It's a good idea to dehorn cattle that live in confined areas to prevent injuries to humans and other animals. Of the various dehorning methods, dehorning with paste is easy, effective, and economical as well as low-stress to the animal.

Here are the main points to consider when using dehorning paste:

1. Apply dehorning paste before calves are 2 days old. After 2 days, calves have figured out how to scratch their heads against something to rub the paste off, and they can also stand on three legs to scratch with the other.
2. Using too much paste is the most common mistake beginners make. Make the result a big bald spot around the horn area (although the hair will grow back in time). The amount of paste to apply on each horn is about the size of a dime, as indicated in the package insert.
3. Don't let the calves get wet for 24 hours after applying the paste. If rain falls on active dehorning paste, it can run off into the eyes and blind the calf. The paste dries in 1 day, after which it is no longer necessary to keep calves dry.
4. Apply paste just before feeding the calves with a bottle. It takes a couple of minutes for the paste to start burning, so if you apply it immediately before feeding, calves are kept busy working on the bottle, and they forget about their discomfort. By the time they are done with the bottle, the paste is almost done with the dehorning process, and they will not notice it that much.

Additionally, research performed with human babies shows that giving breast milk, glucose, or sucrose before a single painless procedure significantly reduces heart rate and crying time compared to using distilled water, a pacifier, or swaddling. So, applying the paste immediately before feeding milk with the bottle may help in two ways: the calves are busy working on the bottle that they forget their discomfort, and the sugar in the milk may help reduce the pain.

Producers who have switched to using paste to dehorn calves at birth report great success with no complications, and they like that calves are “done” without showing obvious signs of pain. Only minor head shaking was reported. If you have any questions, please contact: (541) 737-1931 or aurora.villarroel@oregonstate.edu.

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Dehorn newborn or 1-day-old calves. Apply the dehorning paste right before feeding. Make sure the paste doesn’t get wet for 24 hours.
WHICH METHOD IS BEST?

• Dehorning and disbudding are stressful and painful procedures and thus cause an increase in plasma cortisol concentration.

• **Hot-iron** disbudding causes a slight increase in the total plasma cortisol concentration, which peaks at 30 minutes and returns to pre-treatment levels 2 to 4 hours later.

• **Chemical disbudding** causes a rise in plasma cortisol concentrations within 1 hour of application of the caustic material, and the cortisol concentration returns to pre-treatment levels 4 to 24 hours later.

• **Dehorning** causes an immediate increase in plasma cortisol concentrations, which peak after about 30 minutes and return to pre-treatment levels 5 to 9 hours later.

Source: Farm Animal Welfare Education Centre - Spain
Research

CONCLUSIONS: Given the parameters outlined, sensitivity to individual farm semen and dehorning costs are likely to swamp these differences. Beyond on-farm costs, industry-wide discussion may be warranted surrounding the public’s acceptance and attitude toward polled genetics versus dehorning or disbudding of calves. The authors concluded that the value of avoiding dehorning may be larger for the industry, and perhaps some individual farms, than initially suggested if additional value is put on calf comfort and possible worker aversion to dehorning. If public perception of dehorning influences market access, the expected costs of dehorning may be large but that cost is unknown at present.

RESULTS: The expected costs of the four traditional dehorning methods evaluated in this study ranged from $6 to $25/head, with a mean expected cost around $12 to $13/head. The expected costs of incorporating polled genetics into a breeding program ranged from $0 to $26/head depending on the additional cost, or premium, associated with polled relative to horned genetics. Estimated breakeven premiums associated with polled genetics indicate that, on average, producers could spend up to $5.95/head and $11.90/head more for heterozygous and homozygous polled genetics, respectively, compared with conventional horned genetics (or $2.08 and $4.17/straw of semen at an assumed average conception rate of 35%).
BOVINE CASTRATION

• Should be done as early an age as possible
• Prevents inappropriate breeding
• Necessary to meet market demands
**RESTRAINT**

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CASTRATION RESTRAINT
For castration, use of a rubber ring or surgical removal are preferred. The most appropriate method is the method which is in the best interest of the health and well-being of the animal, as determined by a veterinarian, within the environment in which it is being raised.
CASTRATION - BANDING

- Elastrator band at birth is preferred
- Callicrate® bands for bigger calves
CALLICRATE® CASTRATION
SURGICAL CASTRATION
SURGICAL - EMASCULATOR
CASTRATION METHOD BASED ON BULL BODY WEIGHTS

KSU Survey
PAIN MANAGEMENT
All mechanical and chemical methods of de-horning and methods of castration are painful, and calves benefit from the mitigation of both pain associated with the procedure itself and during the recovery and healing period.
OHIO LIVESTOCK CARE STANDARDS

• (1) For horn removal, disbudding prior to eruption is permissible without pain management; for dehorning after eruption, pain management must be used; and,

• (2) The responsible party in determining the method of castration and use of pain management must take into consideration the animal’s age and weight, environmental conditions, and facilities available as well as human and animal safety.
LOCAL ANESTHESIA – CORNUAL BLOCK
CORNUAL NERVE BLOCK

• Anatomy:
  • Ophthalmic division of the fifth cranial nerve

• Injection site:
  • The upper third of the temporal ridge, about 2.5 cm below the base of the horn.
  • The nerve is relative superficial, about 0.7-1 cm deep.

• Anesthetic:
  • 2% lidocaine 3-5 ml

• Onset of analgesia:
  • 10-15 minutes

• Duration of analgesia:
  • approximately one hour

• Variability:
  • In adult cattle with well developed horns, a ring block around the base of the horn may be necessary.
While it is recognized that some management systems will find difficulty administering local anesthetic immediately prior to the procedure, veterinarians should strive to work with clients to advance its use. It is acknowledged that the use of lidocaine in this manner requires a prescription and should be done in the context of a valid veterinary-client-patient relationship (VCPR).
Fig. 4. Summary of the mean (±SEM) percent change in peak plasma cortisol concentrations ($C_{max}$) in analgesic treated calves compared with untreated castrated control calves in the published literature. The number of treatment groups evaluated is indicated in parentheses. Percent change in cortisol was calculated using the formula $[((\text{mean of analgesic group/mean of castrated control group}) - 1) \times 100$. 

Local Anesthesia  | NSAID  | NSAID + LOCAL  | Sedative-anaesthesia
Non-Surgical (9)  | Surgical (6)  | Non-Surgical (3)  | Surgical (7)  | Non-Surgical (3)  | Surgical (4)  | Non-Surgical (1)  | Surgical (2)  |
LOCAL PAIN MANAGEMENT

• https://m.youtube.com/watch?feature=youtu.be&v=uscpYHsI5Ac
SYSTEMIC PAIN MANAGEMENT

• Anti-inflammatories have been used effectively to mitigate post-procedural pain. Long-acting non-steroidal anti-inflammatory drugs (NSAIDs) should be used to extend the period of analgesia.
FLUNIXIN MEGLUMINE

- Provides a fast-acting NSAID for cattle
- Must be given IV
- Not labeled for analgesia in the U.S.
  - For pyrexia with respiratory disease
  - For endotoxemia
  - For control of inflammation in endotoxemia
MELOXICAM

- Meloxicam has been shown to mitigate post-procedure pain for up to 48 hours after a single dose of the drug. For example, meloxicam administered PO 1.0 mg/kg, or 0.5 mg/kg, IM or IV at the time of the procedure can provide relief from post procedural pain, and promote better short term weight gain and feed intake. The use of NSAIDs after 7 days of age have reduced the risk of bovine respiratory disease when castrations were performed without the benefit of local anesthetic.
EXTRA-LABEL CONSIDERATIONS

- There are no approved pain drugs for use in cattle in the Us. The AMDUCA allows extra-label drug use (ELDU) provided a valid VCPR exists and the drug selection decision process is followed. Although flunixin meglumine is an NSAID labeled for use in cattle and has been shown to have short acting analgesic effects, long acting NSAID analgesics, such as meloxicam, are more desirable to mitigate the pain associated with castration and dehorning.
EXTRA-LABEL USE OF MELOXICAM

• This extra-label drug use is deemed appropriate under the Animal Medicinal Drug Use Clarification Act when proper meat withholding periods are observed. In the case of meloxicam, a meat withholding time of 21 days is recommended after a single dose (Smith G, Extra-label use of anesthetic and analgesic compounds in cattle.

Fig. 1. Cortisol change over time in cattle following amputation (scoop) dehorning. Local anesthesia (bupivacaine) with administration of nonsteroidal anti-inflammatory drug (NSAID; ketoprofen) provides a reduction in measured cortisol concentrations, although a delayed cortisol response is evident without the addition of an anti-inflammatory. The double-headed arrow along the x-axis represents the duration of the local anesthesia provided by bupivacaine. (*Data from* Stafford KJ, Mellor DJ. Dehorning and disbudding distress and its alleviation in calves. Vet J 2005;169(3):337–49.*)