



Alleviation of Pain Associated with Disbudding

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INTRODUCTION

The presence of horns in cattle can be problematic because management of these animals increases the risk of injury for both farm workers and cattle. To alleviate the issue of raising cattle with horns, a management practice called “disbudding” is used in today’s industry to improve both human and animal safety. Briefly, a hot iron disbudding device is pressed over the horn bud of calf for 10-15 seconds during the first few weeks of life. This procedure kills the horn bud effectively preventing the development of horns (Figure 1).

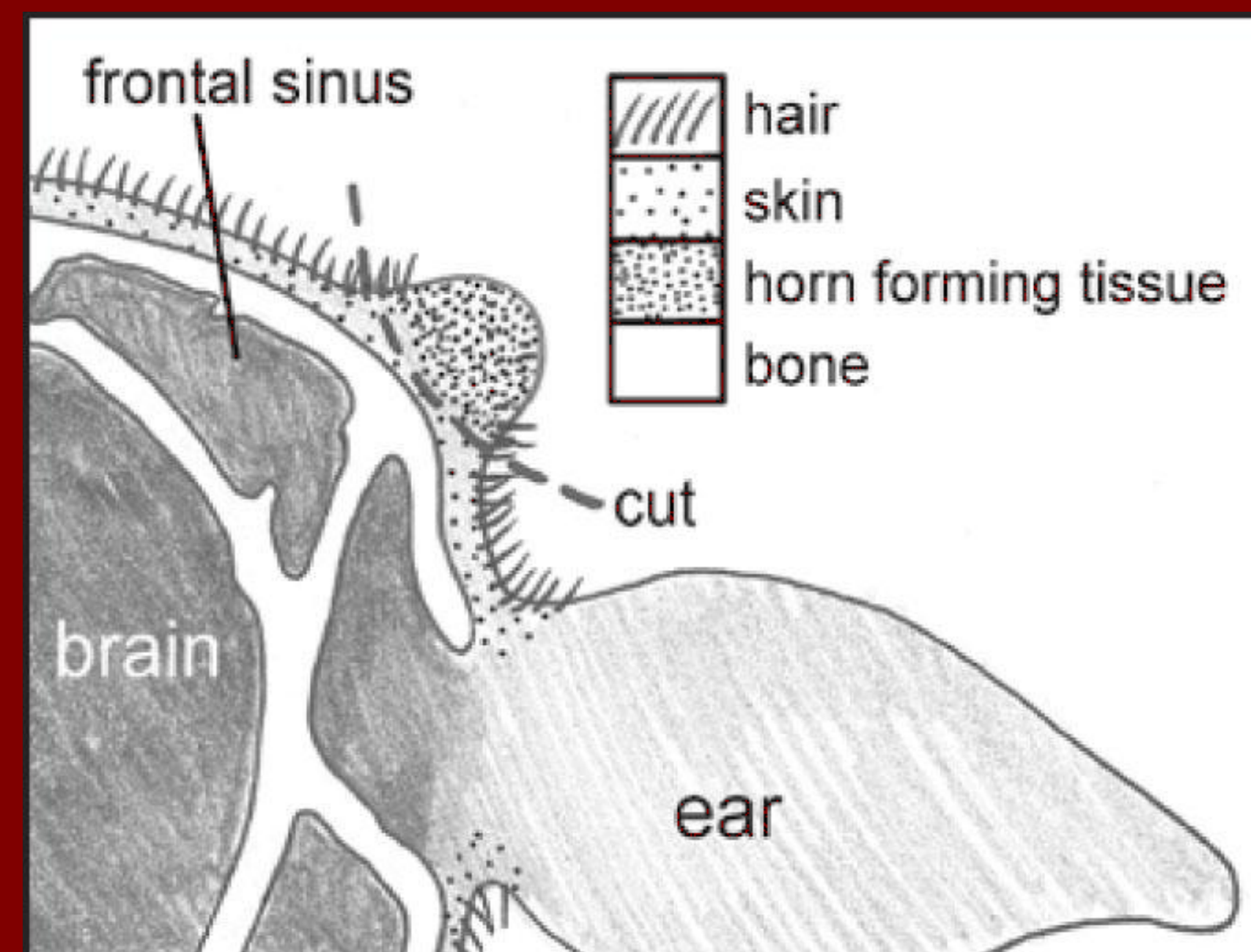


Figure 1. Diagram of a Calf Head with Horn Buds¹

The practice of disbudding is known to cause a pain and distress in calves, which can lead to reduced intake of feed and weight gain². Although there are no FDA-approved pharmaceuticals to alleviate the pain and distress in cattle, one common method used to reduce pain from disbudding is a cornual nerve block with the local anesthetic Lidocaine. The effects of Lidocaine, however, have been found to last for only 60-90 minutes following disbudding³. Because the pain associated with disbudding and inflammation persist longer than 60-90 minutes, a longer term method of providing pain relief is needed to improve the well-being of calves that are disbudded. Neurolysis is the intentional destruction of specific nerves and is currently used as a form of anesthesia in humans with conditions causing chronic pain. When alcohol neurolysis is used as a form of anesthesia, 93% of patients had instant pain relief and 72% of patients had 3 years of relief with a single injection that could have lasted in upwards of 6 years or more⁴. The combination of rapid onset and long-term anesthesia make alcohol neurolysis a potential new method for alleviating pain associated with the disbudding of calves.

OBJECTIVES

- Determine if anesthesia of the horn bud can be induced via cornual nerve block using ethyl alcohol
- Determine the duration between administration of the block and onset of anesthesia
- Determine the duration of anesthesia of the cornual nerve blocks

METHODS & MATERIALS

A total of 16 Holstein bull calves ranging in age from 1 to 6 weeks of age were used for 2 week duration of the study. Calves were ranked according to age and systematically assigned to one of 4 anesthesia treatments (n=4).

1. 0.9% Saline (SAL; 5 ml per horn bud)
2. 2% Lidocaine (LID; 5 ml per horn bud)
3. 75% Ethyl Alcohol (ALC; 5 ml per horn bud)
4. 2% Lidocaine (2.5 ml) + 75% Ethyl Alcohol (2.5 ml) (MIX; 5 ml per horn bud)

Assessment of Nerve Block

1. Prick Test

- Needle prick area surrounding each horn bud on each horn bud
- Tested at 12, 3, 6, & 9 o'clock locations
- Applied at 5, 10, 15, 20, 30, 60 min. on day 1, and once daily from days 2 to 14
- Performed by the same blinded observer once daily for two weeks or until the horn became sensitive

2. Behavior Assessment

- Evaluation of behavioral response to prick test
- “Blocked” defined as no movement in response to prick test
- “Not Blocked” defined as: Pulling on halter, Throwing head back, Backing away from handler, Falling down
- Observation
 - Live observations for 2 weeks following treatment and video recordings were used to assess response to prick test
 - 15 Animal Management Students assessed the videos for responses of the calves on the first day of evaluation
 - A Veterinarian assessed the videos and did live observations from day 2 to 14. Once a horn bud scored as sensitive (not blocked), no further tests were performed for that horn bud
 - Each horn bud was observed independently
- Proc Mixed procedures in SAS were used for analysis

RESULTS

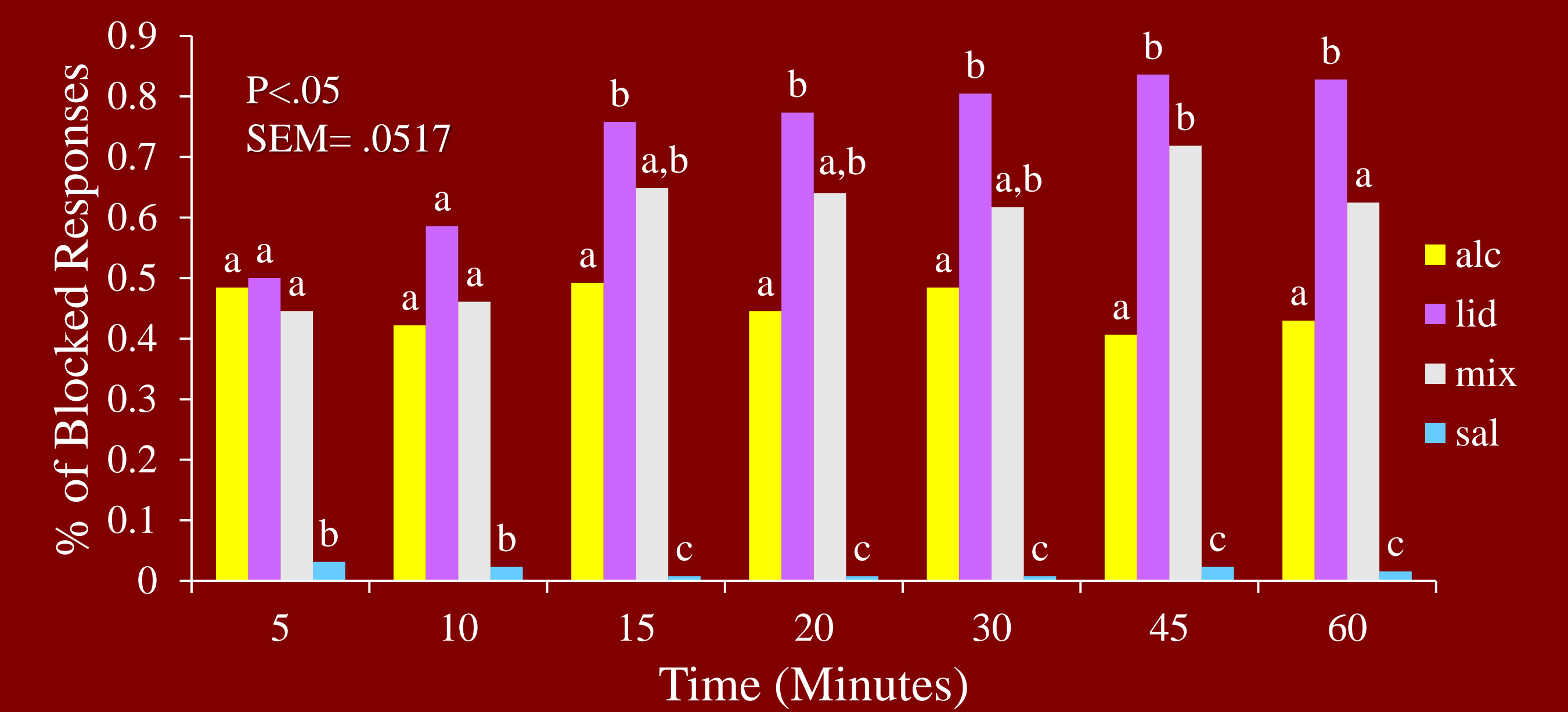


Figure 2. Least squares means and standard errors for prick test responses of calves. Columns with different superscripts (a,b,c) differ significantly ($P < 0.05$).

- For the Lidocaine treatment, 25% of the buds blocked within 5 minutes
- For the mixture and ethyl alcohol treatments, 18.75% of the buds blocked within 5 minutes
- Both the mixture and ethyl alcohol treatments were seen to block for a full 2 weeks, and Lidocaine only blocked for the first day

DISCUSSION

In order for producers to effectively and safely manage their herd, practices such as dehorning are necessary for the well-being of workers and animals, but more work is needed to improve the pain relief from this practice. The preliminary data of the present study shows that ethyl alcohol could be a viable cornual nerve block for reducing pain at the horn buds when disbudding calves instantaneously and over 14 days. Although behavior alone was assessed in this pilot study, more comprehensive research is needed to effectively evaluate ethyl alcohol as a cornual nerve block. Future research needs include monitoring pain associated behaviors during and following the disbudding of calves, in addition to an evaluation of blood cortisol concentrations, health, and performance of disbudded calves.

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