



## Measuring and mitigating pain during castration

**Project Code:** ANH.21.13  
**Completed:** March 2016

### Project Title:

Effect of age and handling on pain assessment and mitigation of common painful routine management practices

### Researchers:

Karen Schwartzkopf-Genswein, Ph.D. and Ed Pajor, Ph.D. [Karen.genswein@agr.gc.ca](mailto:Karen.genswein@agr.gc.ca)  
Karen Schwartzkopf-Genswein, Ph.D. (Agriculture and Agri-Food Canada) and Ed Pajor, Ph.D. (University of Calgary), Eugene Janzen, D.V.M; M.V.S.) (University of Calgary), and Pain and Animal Welfare Group (University of Calgary)

### Background

Public concern regarding the pain associated with castration, dehorning and branding of beef cattle is increasing. Past research has focused on individually housed dairy calves, or feedlot cattle. There is a lack of information regarding the influence of age and pain medication on preweaning beef calves in a herd environment.

### Objectives

To evaluate the relative impacts of age, technique, and pain medication when preweaning beef calves are castrated at the same time as branding or as a separate procedure.

### What they did

Angus-cross bull calves were divided into three groups of 36 head. Groups were either castrated at 1-week (early April), 2-months (late May), or 4-months of age (early August). In each age group, 12 were knife-castrated, 12 were banded, and 12 were not castrated (control) but otherwise handled the same. The 1-week group was handled on the ground. A tip table was used for the 2-month group, and a hydraulic squeeze was used for the 4-month group. Scalpels were used for surgical castration at 1-week of age. A Newberry knife was used in older calves. Rubber rings were used for band castration in the 1-week and 2-month calves and a Callicrate bander was used in 4-month calves. Acute pain was evaluated using intensive physiological and behavioral pain measurements collected the day before castration, during castration, the hours immediately after and the first seven days after castration. Chronic pain and scrotal swelling and healing were assessed using weekly physiological and behavioral measurements collected over six to nine weeks, and weaning weights were compared.

### What they learned

Acute pain in the first week after castration differed between methods. Regardless of age, behavioral responses at the time of castration were strongest for knife-castrated calves, intermediate for banded calves, and lowest for the controls. At 2- and 4-months, knife castrated calves kicked and bawled more than band or control calves. Signs of pain related to tail flicking, lying, standing and walking behavior were also more evident in surgical than band or control calves in the hours and days after castration at 2- or 4-months. Scrotal temperatures were lower in banded than in surgical or control calves at all ages.

Strictly speaking, the effect of castrating at different ages couldn't be compared statistically, because the calves were castrated in different months, and because handling and castration techniques varied slightly between the age groups. Technicalities aside, only two or three pain indicators were apparent in either castrated group compared to control calves at 1-week. At 2-months, nine pain indicators were different in surgically castrated than control calves, while only two indicators were different in banded calves. At 4-months, 12 pain indicators were significantly higher in surgically castrated than control calves, and five were higher in banded calves.

Chronic pain beyond the first week of castration was not observed in calves castrated at 1-week or 2-months of age. Standing and lying behavior was significantly altered in the six to nine weeks following castration in calves banded at 4-months of age compared to control or surgically castrated calves.

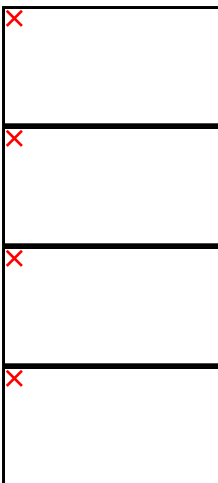
Scrotal swelling and healing: There was less scrotal swelling and swelling went down sooner in surgically than band castrated calves at all ages. Scrotums healed at the same time for both methods in the 1-week and 2-month groups. Surgically castrated calves healed much sooner than banded calves in the 4-month group.

Performance: Initial weights at the time of castration were the same within each age group, but weaning weights were significantly lower for knife calves than with banded or control calves at 1-week (507 vs. 557lbs) and 4-months (518 vs. 535lbs) but not at 2-months of age (507lbs).

### What it means

Castrate calves as young as practically possible. Banding caused less acute pain than surgical castration banding at 2-months, but more chronic pain at 4-months.

### Proudly Funded By:



The Beef Cattle Industry Science Cluster is funded by the Beef Cattle Research Council, a division of the Canadian Cattlemen's Association, and Agriculture and Agri-Food Canada to advance research and technology transfer supporting the Canadian beef industry's vision to be recognized as a preferred supplier of healthy, high quality beef, cattle and genetics.

**For More Information Contact:**  
Beef Cattle Research Council  
#180, 6815 - 8th St. NE  
Calgary, AB T2E 7H7  
Tel: (403) 275-8558 Fax: (403) 274-5686  
[info@bcfrresearch.ca](mailto:info@bcfrresearch.ca)

**For More Information Visit:**  
[www.bcfrresearch.ca](http://www.bcfrresearch.ca)

RESEARCH AND TECHNOLOGY DEVELOPMENT FOR THE CANADIAN BEEF INDUSTRY