

Evaluation of a CO₂ laser scalpel for disbudding Holstein calves, a pilot study

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Introduction

Refinement of the disbudding procedure on dairy farms using a CO₂ laser scalpel may improve calf welfare. The objective of this project was to test the utility of a CO₂ laser scalpel in bovine disbudding; and to compare healing and pain measures to cautery hot-iron disbudding.

Materials and methods

Twelve Holstein bull calves, aged 6 to 39 days of age were enrolled in the study. Calves were randomly assigned to either be disbudded with a CO₂ laser scalpel (Laser, n = 6) or cautery hot-iron (Hot-iron, n = 6). Calves were sedated with xylazine; given oral meloxicam and a corneal lidocaine block prior to the procedure. Outcome measures were maximum surface temperature by infrared thermography (IRT), mechanical nociception threshold (MNT), and digital images for wound healing. The IRT and MNT measures were collected prior to disbudding and out to 72 h post-procedure. Images for wound healing were collected at baseline, 6, 24, 72 h, and 7, 14, 28, 42 days post-disbudding.

Results

No differences in overall maximum surface temperatures (Laser 35.3 ± 0.3°C vs. Hot-iron 36.0 ± 0.3°C; *P* = 0.10) or MNT (Laser 2.28 ± 0.19 vs. Hot-iron 2.42 ± 0.19 kgf; *P* = 0.59) were noted. All 6 calves in the Laser group were completely healed by day 42, whereas only 4/6 of the Hot-iron calves were fully healed.

Significance

These results suggest calves disbudded using a CO₂ laser scalpel may be painful based on the outcomes measured. Laser calves healed faster than cautery disbudded calves. Future research is needed to assess pain in unsedated calves at later time points.

