

2018 BREECH FLYSTRIKE RD&E TECHNICAL UPDATE

Welfare assessments of analgesic
options in female lambs for surgical
mulesing and its alternatives

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Objectives

- To assess the efficacy of Ilium Buccalgesic[®] OTM (meloxicam), alone, and in combination with Tri-Solfen[®], in reducing the pain responses of female Merino lambs (aged 6 – 10 weeks) subjected to surgical mulesing or liquid nitrogen application (LNP);
- To assess the efficacy of Ilium Buccalgesic[®] OTM (meloxicam), in reducing the pain responses of older female Merino lambs (aged 8 – 10 month) subjected to surgical mulesing, or liquid nitrogen application (LNP);
- To assess the welfare outcomes of LNP as a means of breech modification in both young (aged 6-10 weeks) and older (aged 8-10 months) female Merino lambs.

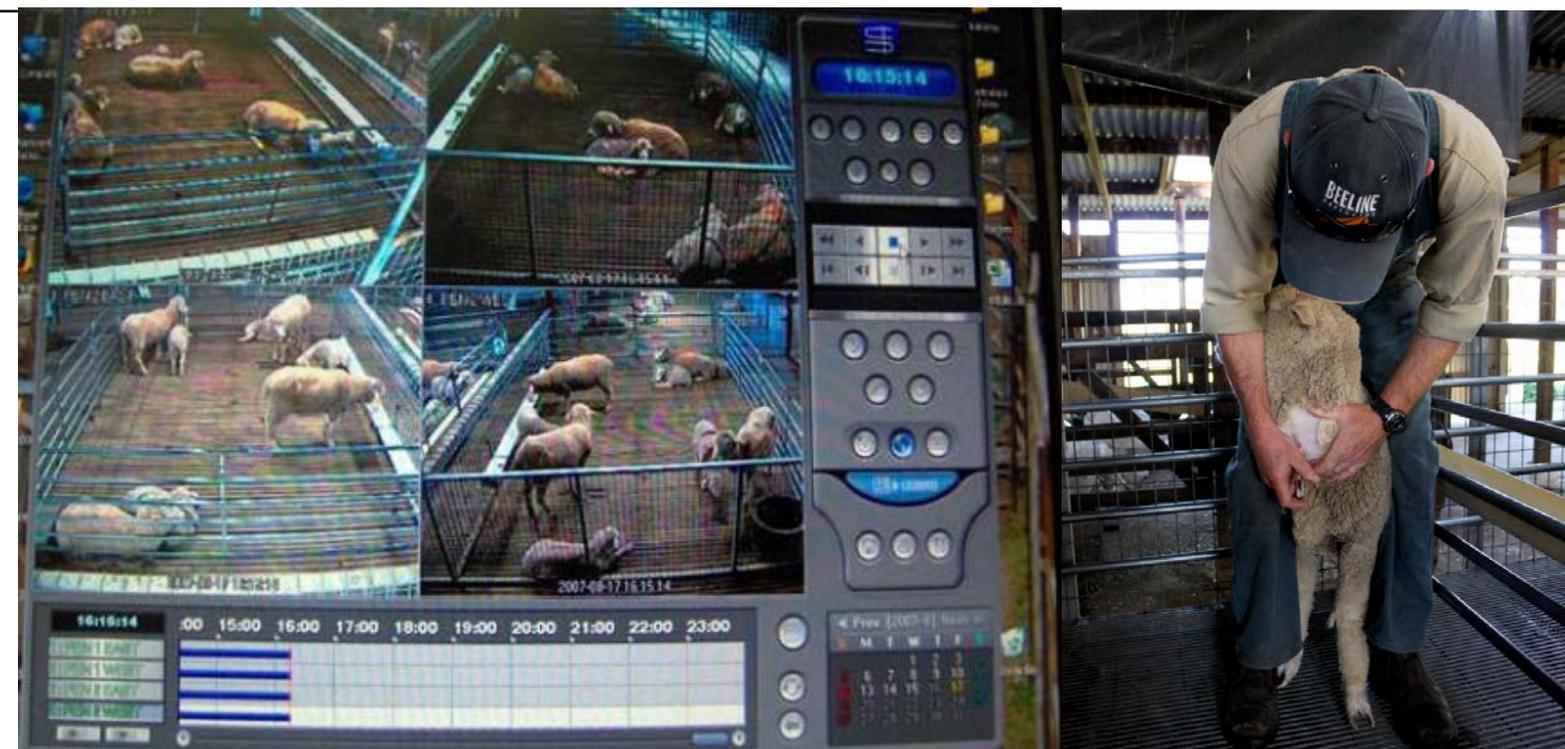


Method

- Controlled, blinded studies
- GLP protocols
- Physiology
- Behaviour

Table is an example of one of 5 ‘cohorts’ in the trial

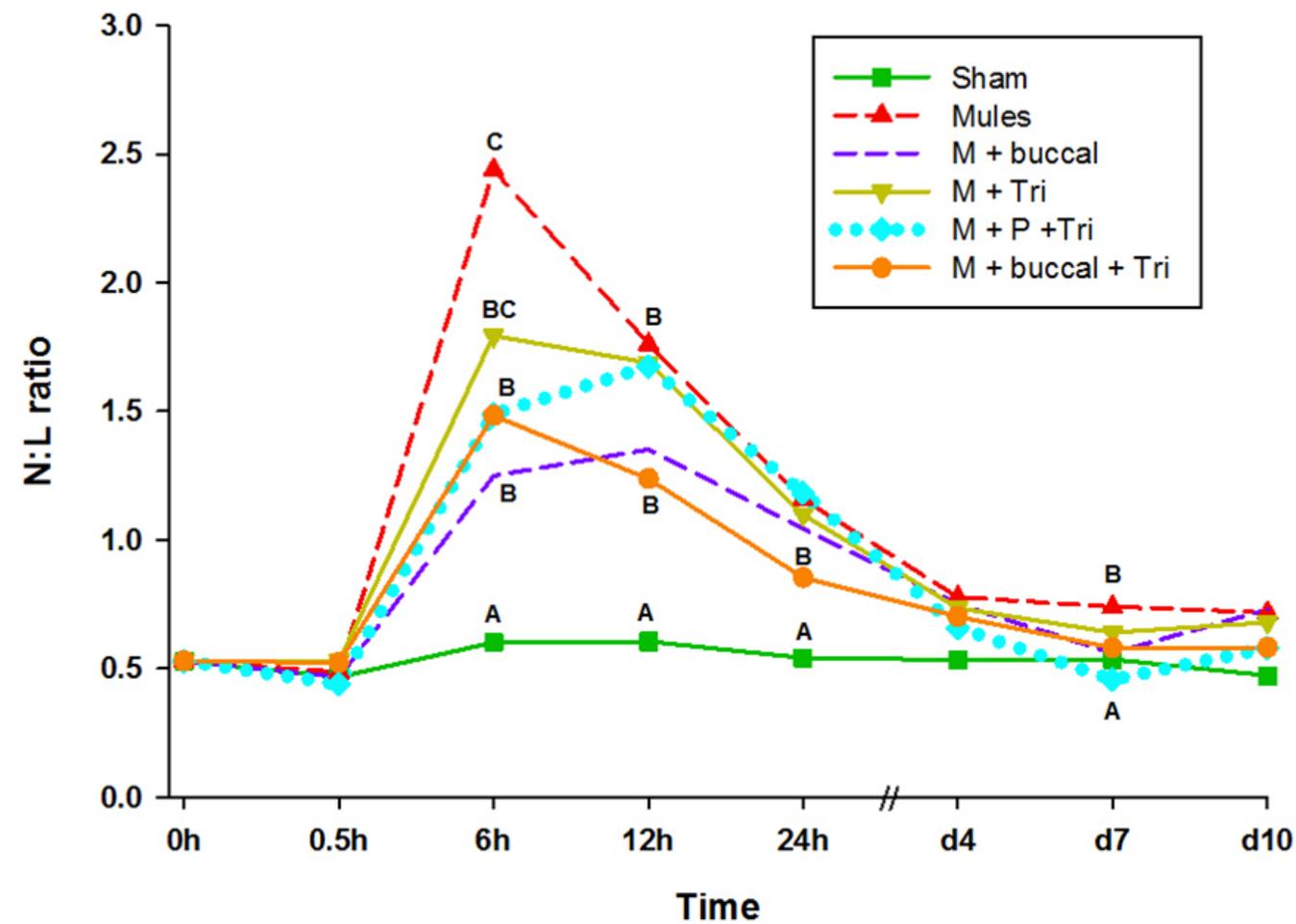
Group	Procedure	Therapeutic agent	No. lambs
1	Sham controls, handled	Placebo	20
2	Surgical mulesing and hot knife tail docking	Placebo	20
3	Surgical mulesing and hot knife tail docking	Buccalgesic	20
4	Surgical mulesing and hot knife tail docking	Tri-Solfen	20
5	Surgical mulesing and hot knife tail docking	Placebo + Tri-Solfen	20
6	Surgical mulesing and hot knife tail docking	Buccalgesic + Tri-Solfen	20



The following results are only a “snap shot” of the results of the total trial, see www.wool.com for Summary report.



Results - Analgesic Options for Surgical Mulesing



Mean Neutrophil:Lymphocyte ratio by treatment and time (back transformed data)

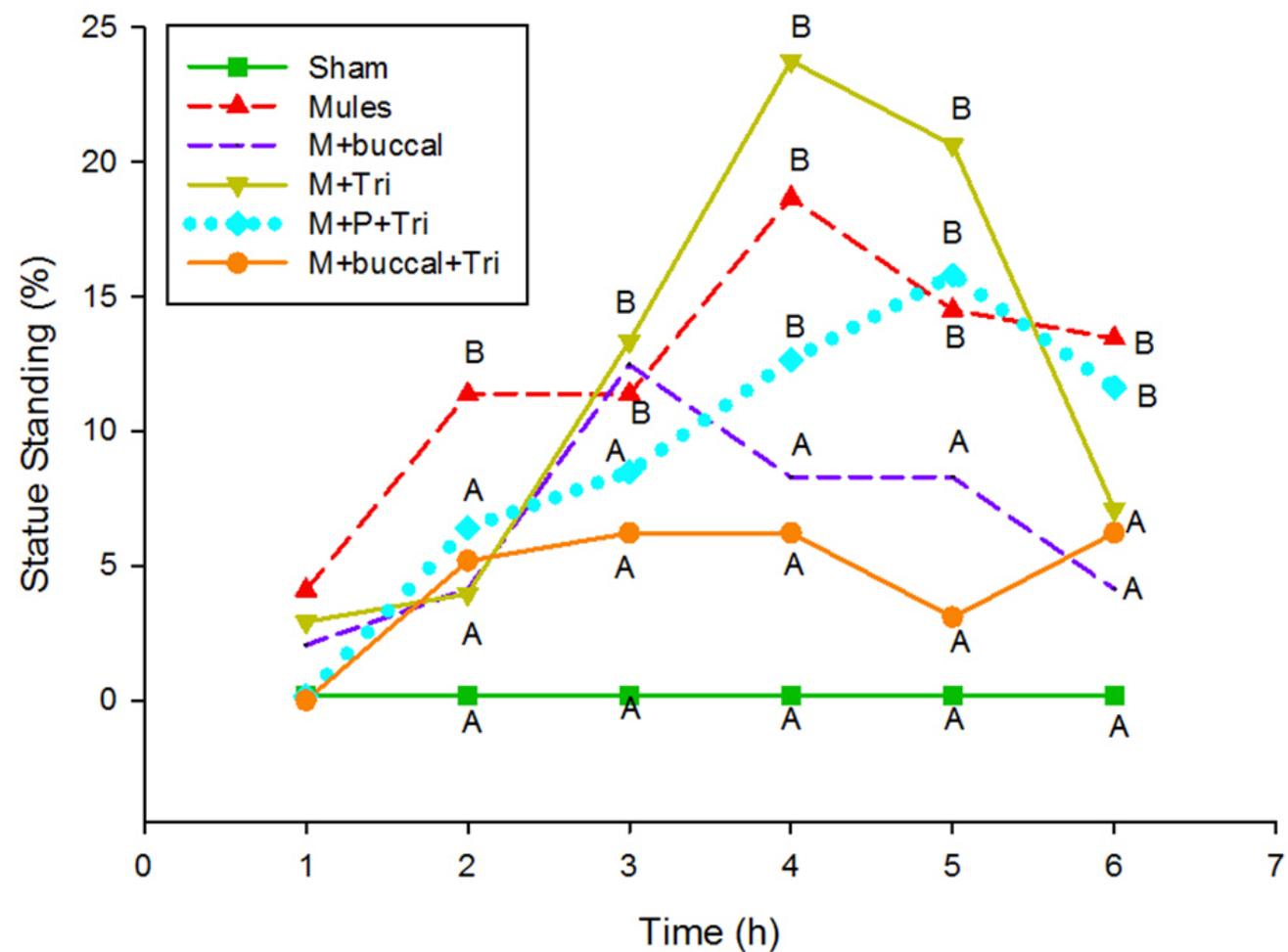
Mules = mulesed, M = mulesed, buccal = Buccalgesic, Tri = Tri-Solfen, P = placebo

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Note, only the first 6 hours were observed for “behaviors”, in future trials likely to increase the observation assessment period



Results - Analgesic Options for Surgical Mulesing

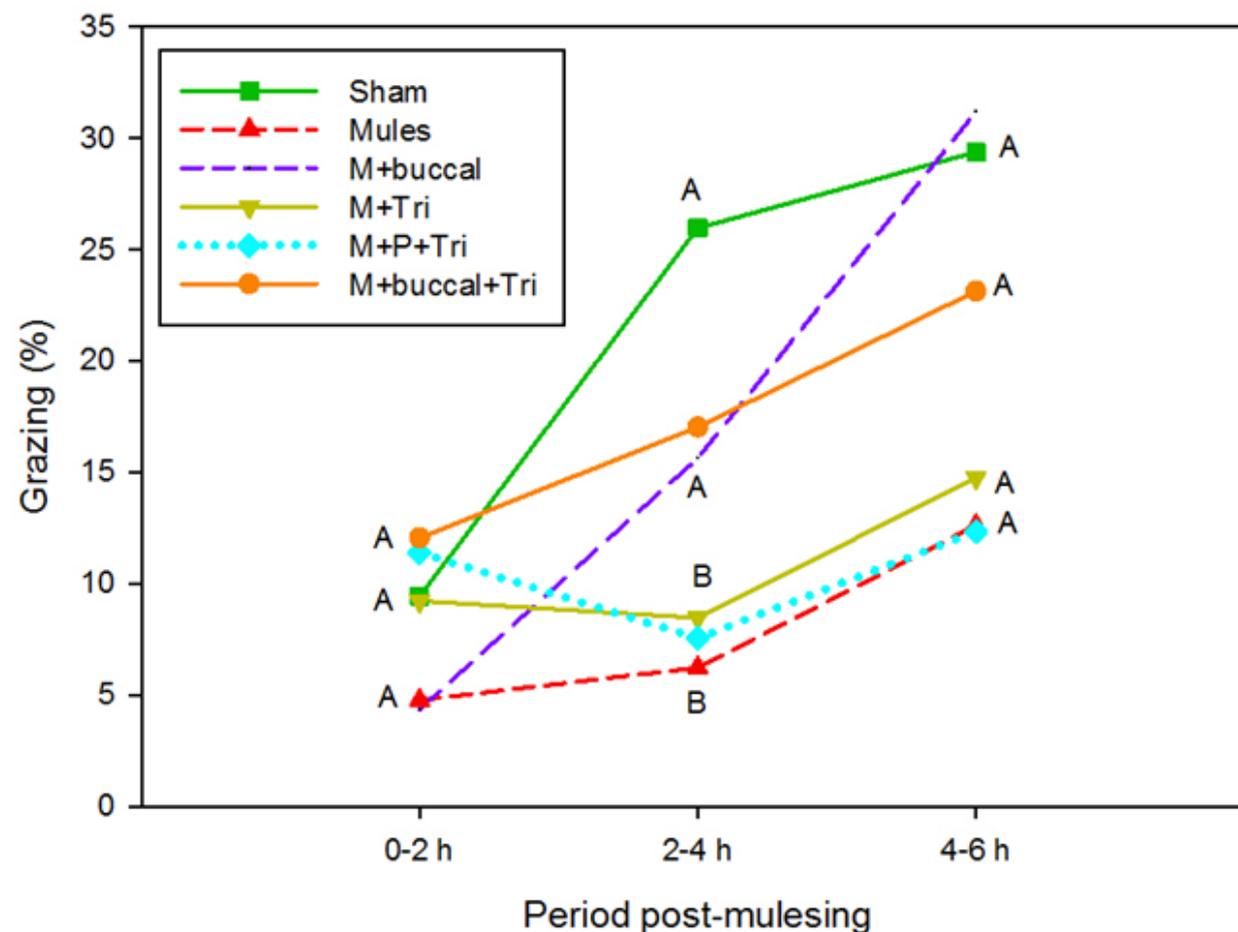


Pen study - Statute standing behaviours displayed by lambs over the 6 hour observation period

Mules = mulesed, M = mulesed, buccal = Buccalgesic, Tri = Tri-Solfen, P = placebo

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - Analgesic Options for Surgical Mulesing

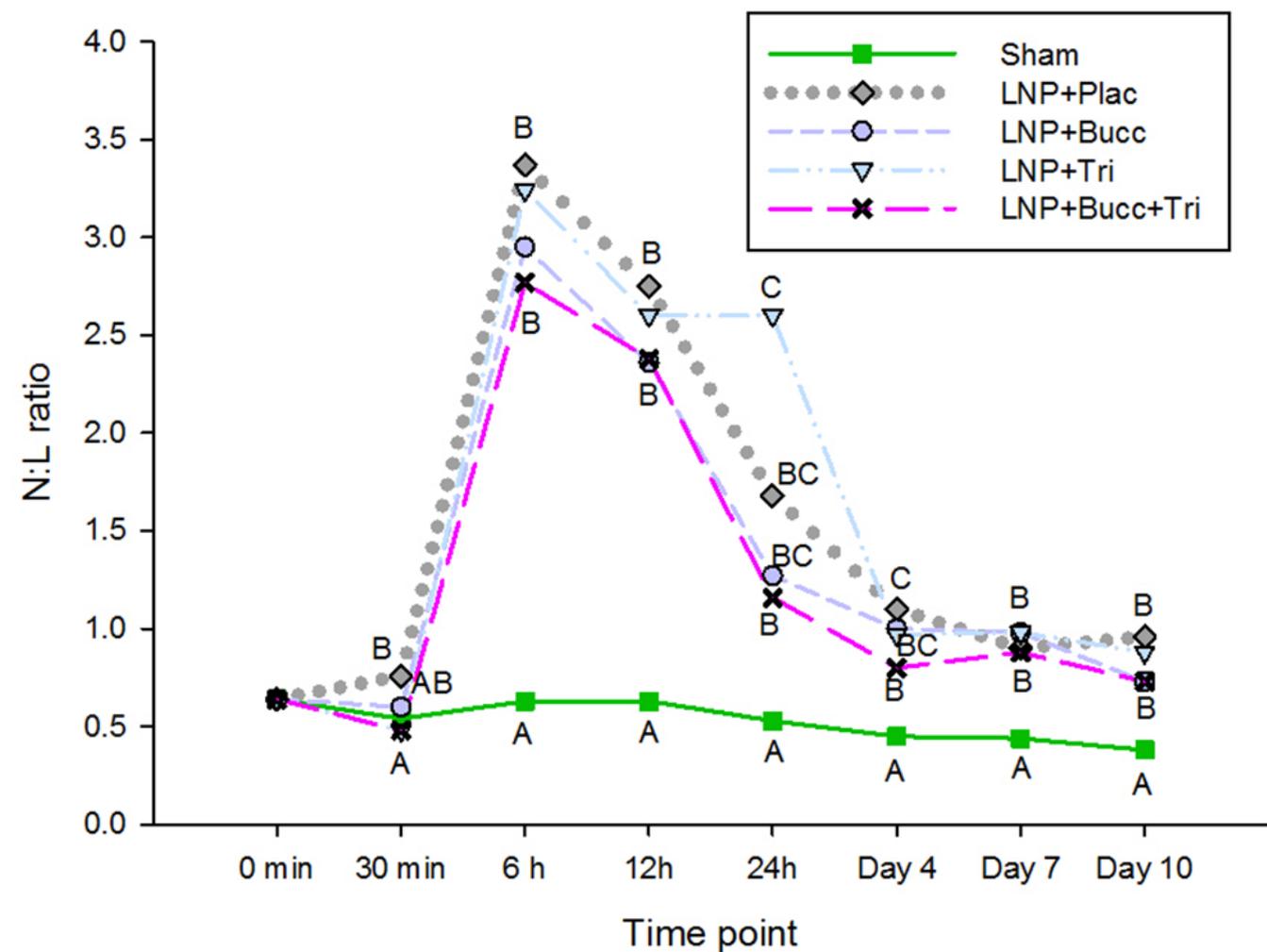


Field study - Percentage of Time Spent Grazing in the First 6 Hours Post Mulesing

Mules = mulesed, M = mulesed, buccal = Buccalgesic, Tri = Tri-Solfen, P = placebo

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - Analgesic Options for Young Lambs Undergoing the LN Process

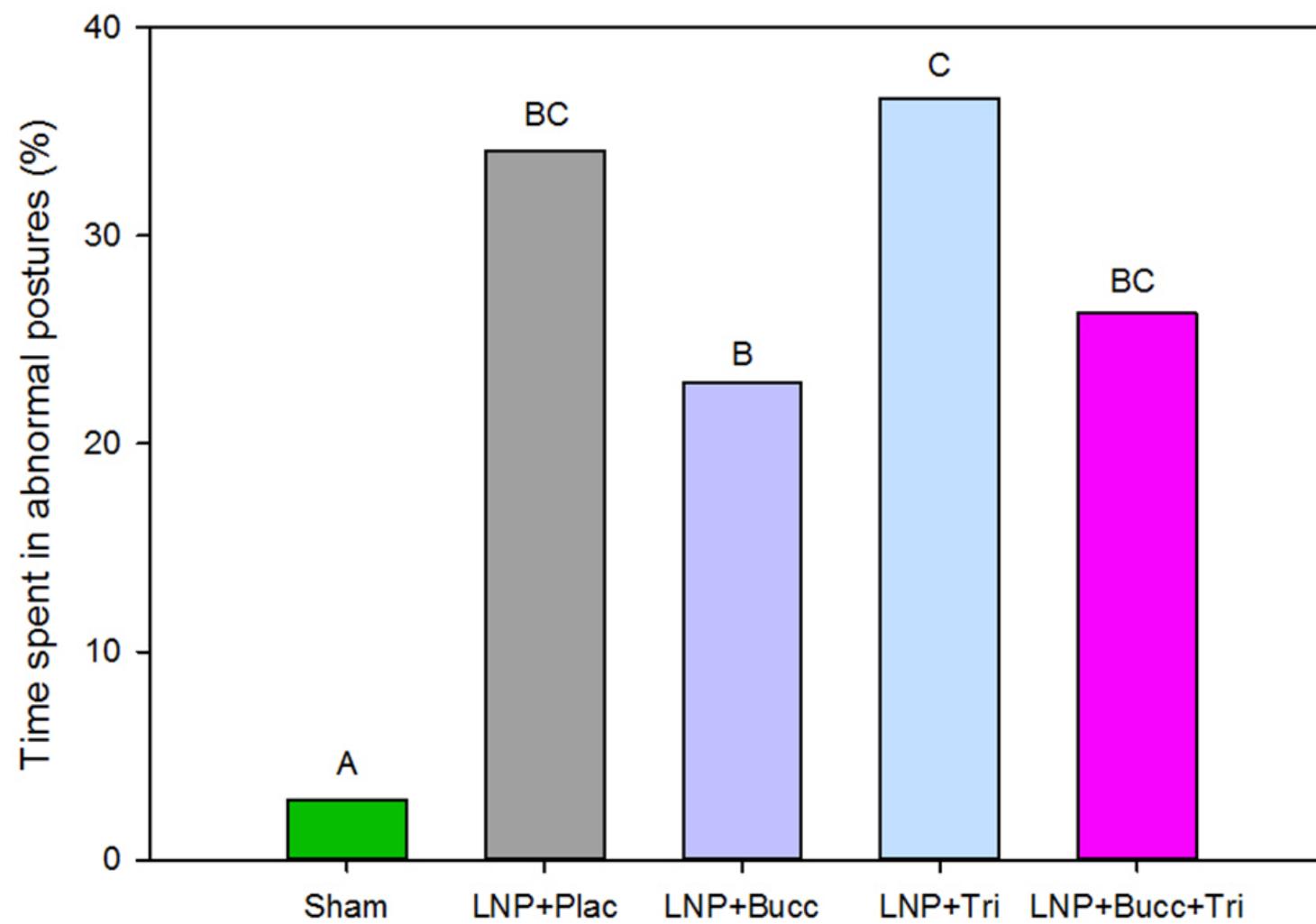


Mean Neutrophil:Lymphocyte ratio by treatment and time (back transformed data)

LNP = liquid nitrogen process, Plac = placebo, Bucc = Buccalgesic, Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - Analgesic Options for Young Lambs Undergoing the LN Process

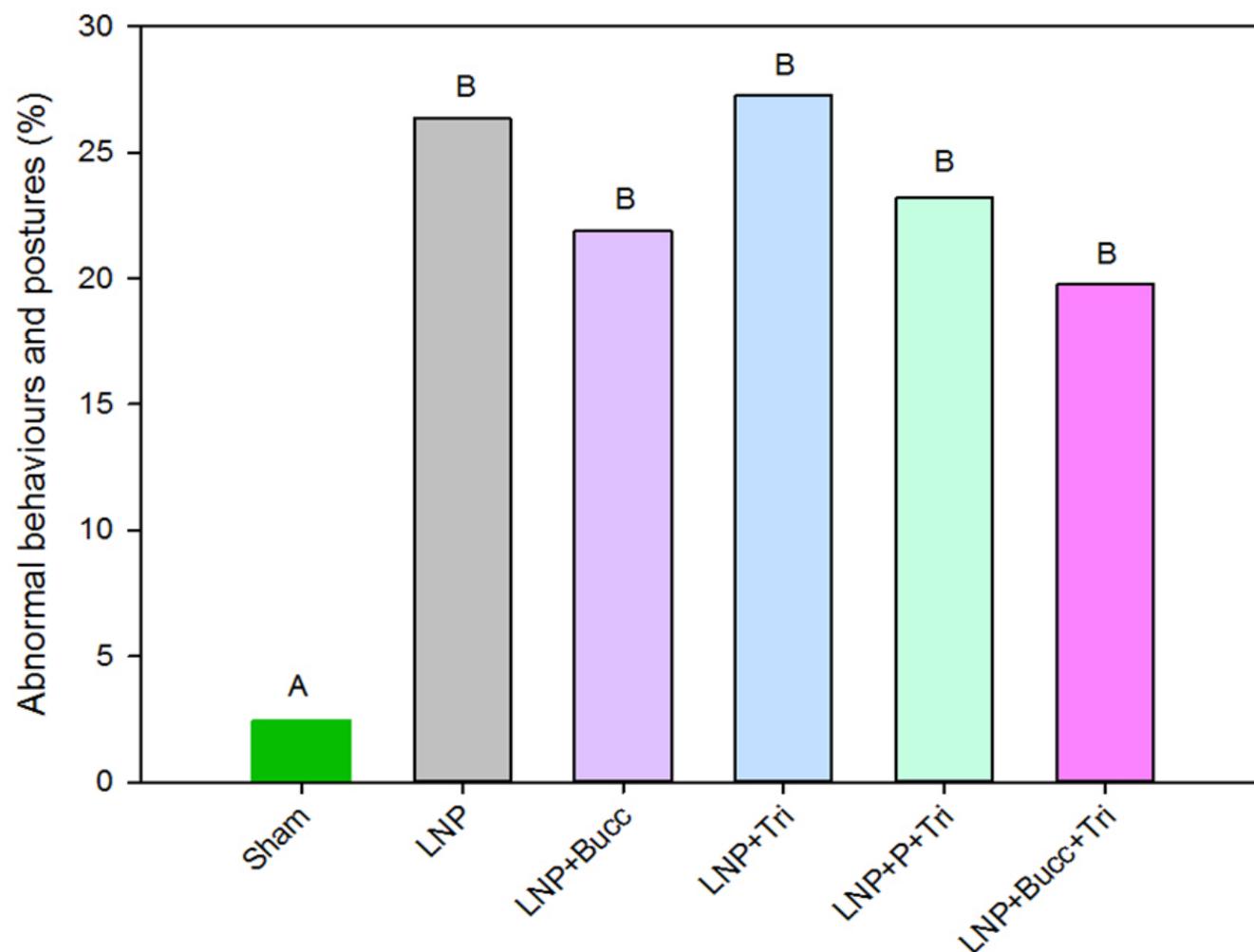


Pen study – Time spent in abnormal postures over the 6 hour observation period

LNP = liquid nitrogen process,
 Plac = placebo, Bucc = Buccalgesic,
 Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - Analgesic Options for Young Lambs Undergoing the LN Process

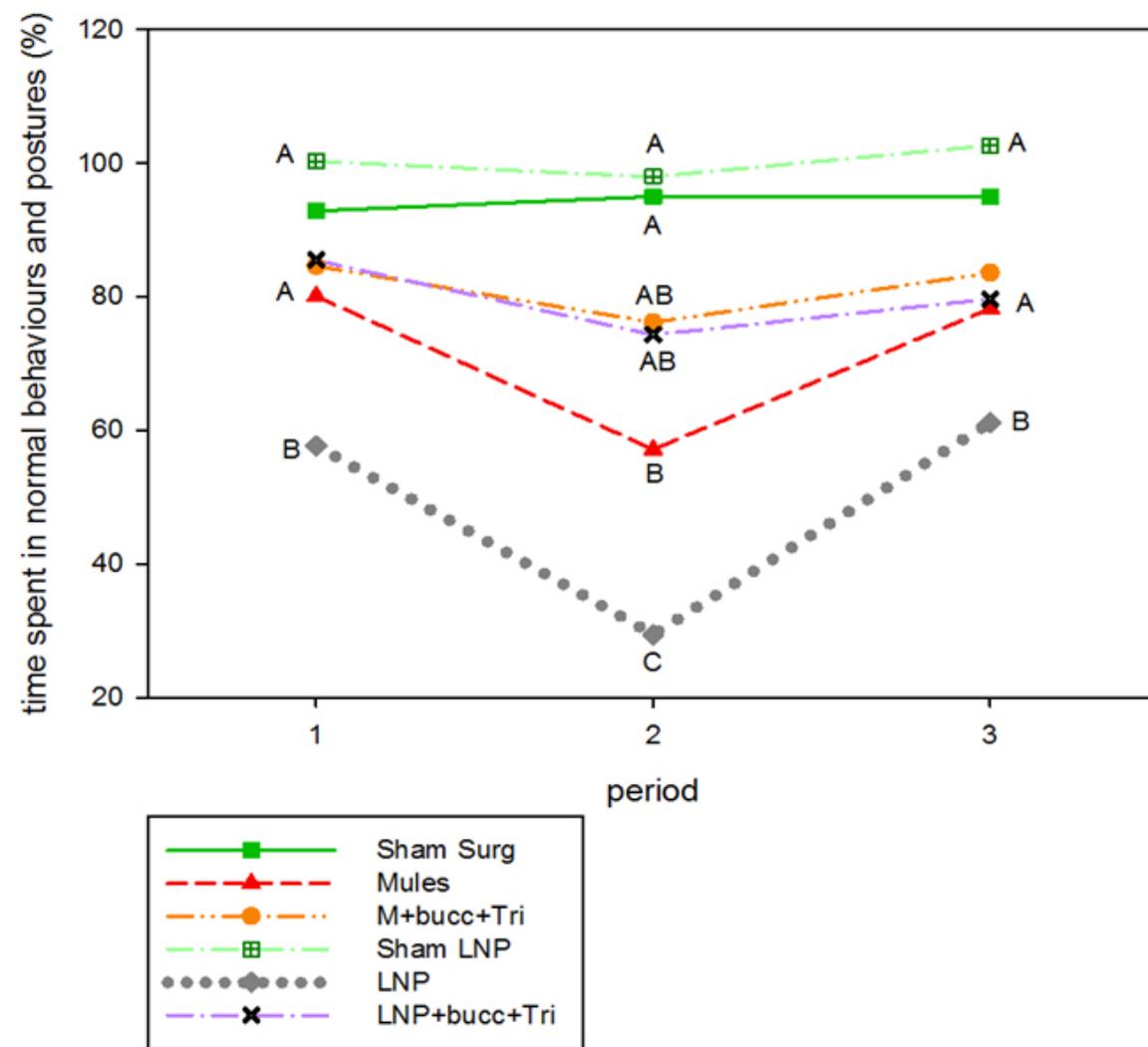


Field study – Time spent in abnormal postures over the 6 hour observation period

LNP = liquid nitrogen process,
 Plac = placebo, Bucc = Buccalgesic,
 Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - A Comparison of Surgical Mulesing and LNP in Young Lambs

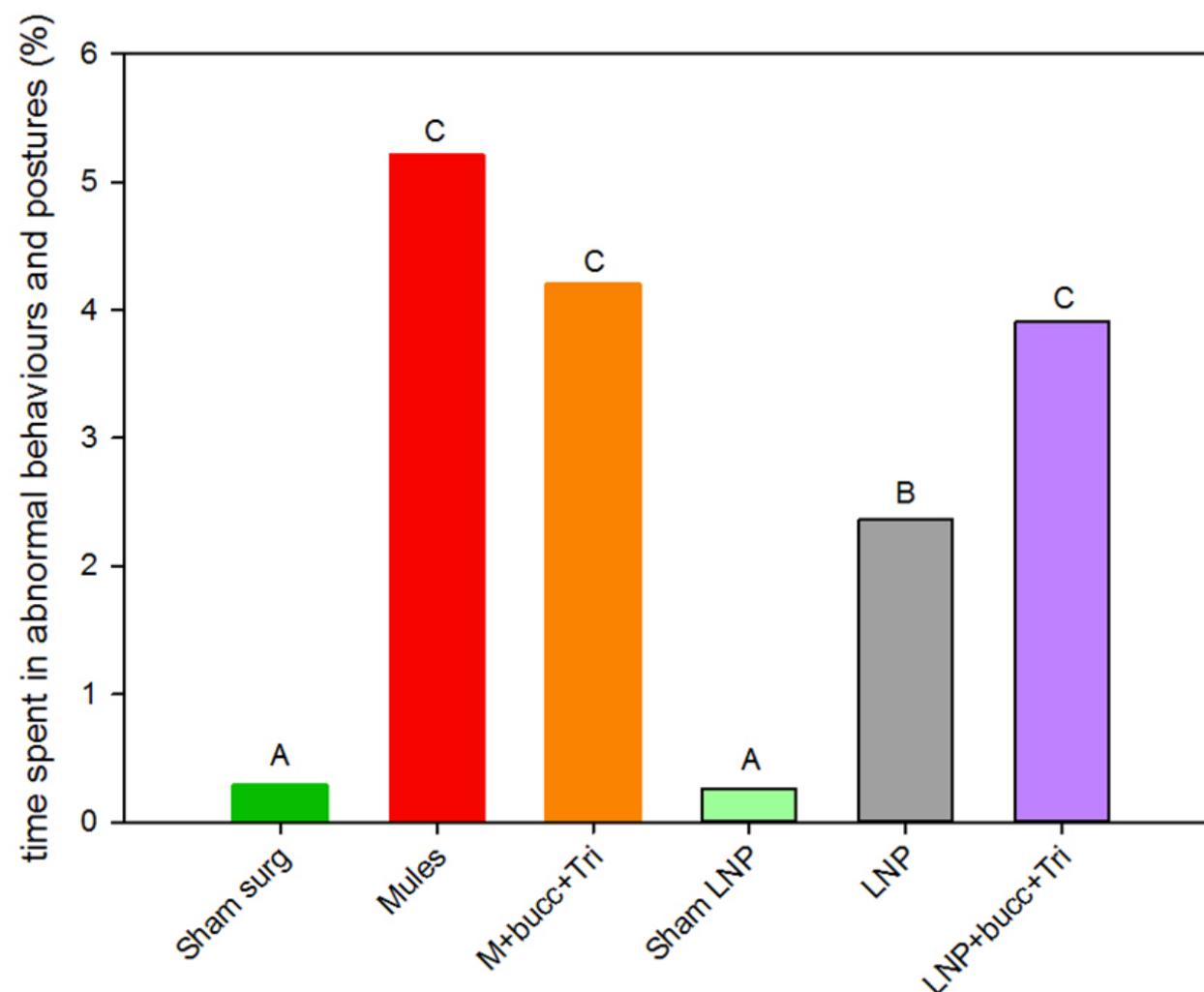


Field study – Time spent in normal postures and behaviours over the 6 hour observation period

Mules, M, Surg = mulesed,
 LNP = liquid nitrogen process,
 Bucc = Buccalgesic, Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - A Comparison of Surgical Mulesing and LNP in Young Lambs

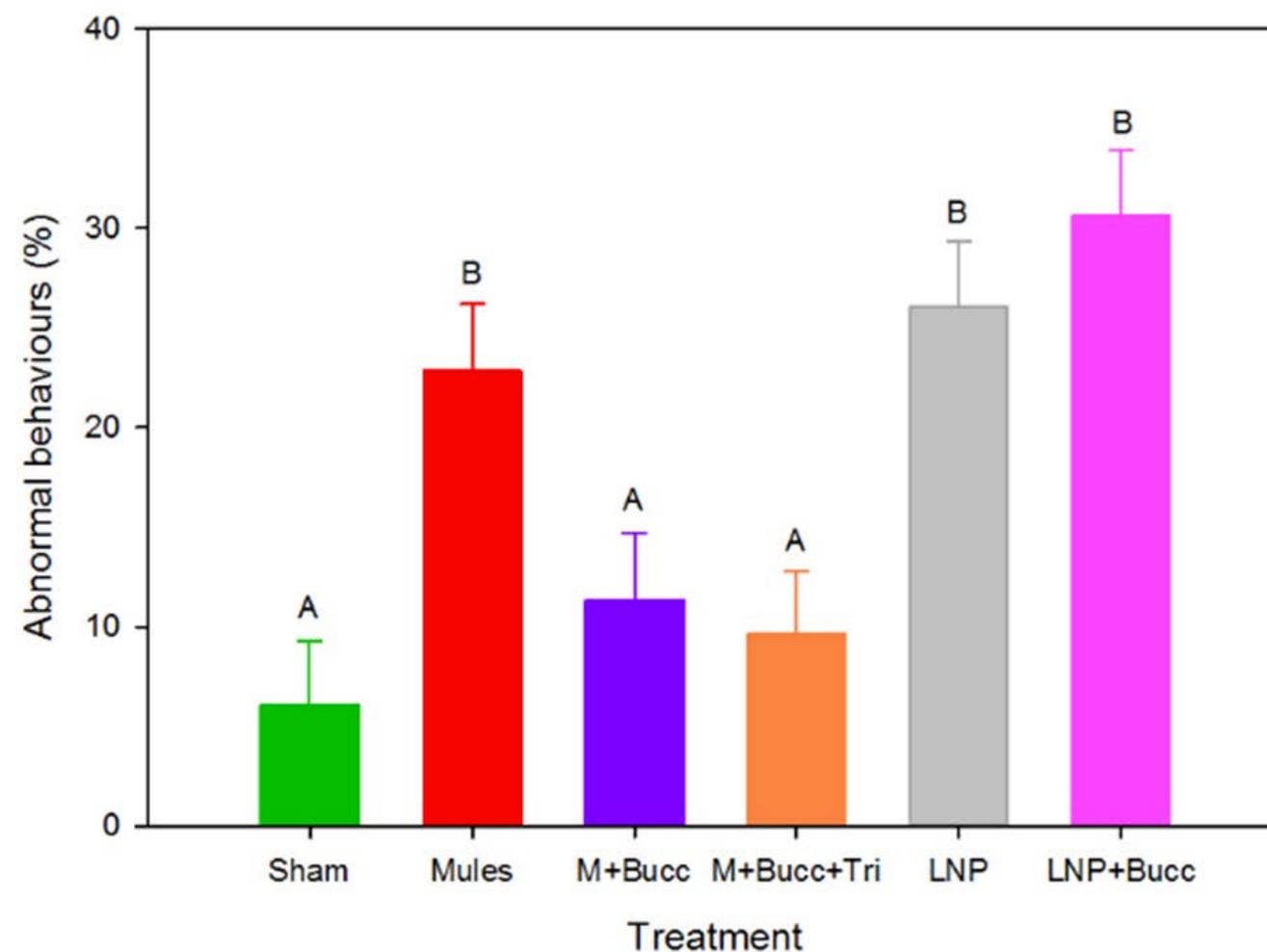


Field study – Time spent in abnormal postures and behaviours over the 10-day post procedure period

Mules, M, Surg = mulesed,
 LNP = liquid nitrogen process,
 Bucc = Buccalgesic, Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - A Comparison of Surgical Mulesing and LNP in Weaner Lambs

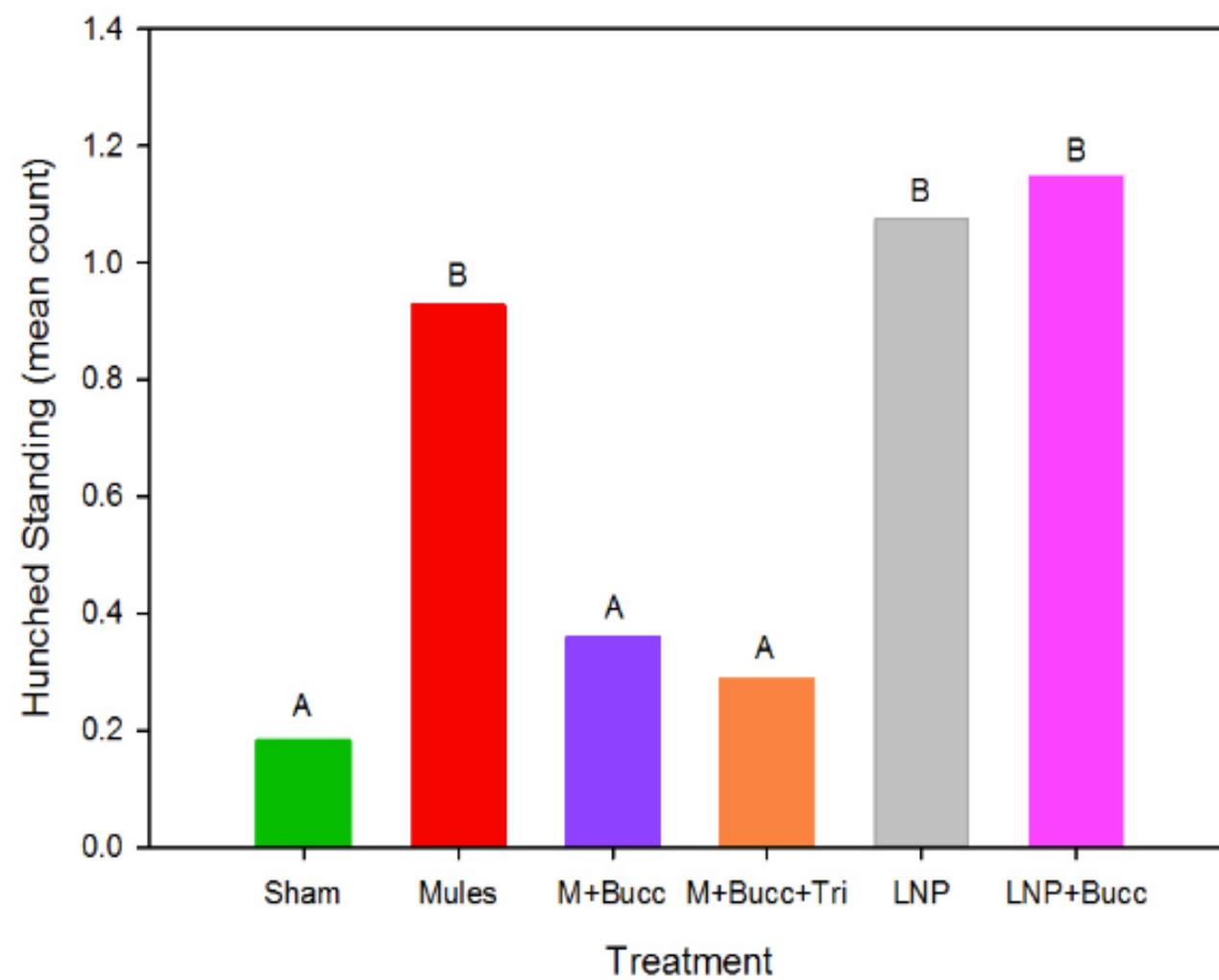


Field study – Time spent in abnormal postures and behaviours over the 6 hour observation period

Mules, M = mulesed,
LNP = liquid nitrogen process,
Bucc = Buccalgesic, Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Results - A Comparison of Surgical Mulesing and LNP in Weaner Lambs



Field study – mean count of hunched standing over the 6 hour observation period (backtransformed)

Mules, M = mulesed,
 LNP = liquid nitrogen process,
 Bucc = Buccalgesic, Tri = Tri-Solfen

A, B, C: within each time point, data points with different letters are significantly different ($P < 0.05$)

Conclusions – Overall Assessment of Analgesic Options for Surgical Mulesing

- **Use of the analgesic agents Buccalgesic and Tri-Solfen singly or in combination improved the welfare of lambs undergoing surgical mulesing.**
 - Benefits lasted for at least 6 hours post mulesing (duration of behaviour observations), and up to 24 hours (physiology).
 - Tri-Solfen provided rapid-onset analgesia, but the duration of analgesic effect was shorter than that of Buccalgesic.
 - Buccalgesic was slower to provide effective analgesia, but the duration of analgesic effect was longer than that of Tri-Solfen.
 - The best outcome was seen where Tri-Solfen and Buccalgesic were used in combination, delivering the benefits of both local anaesthetic and non-steroidal anti-inflammatory agents.

Conclusions – Overall Assessment of LN Process

- A significant advantage over surgical mulesing (other than it is a bloodless method) was not identified.
- Analgesic administration did not appear to afford much benefit to weaner lambs.
- The analgesic agents did provide some mitigation of the pain response in young lambs undergoing LNP.
 - Was this mitigation of the pain of tail-docking, or mitigation of the discomfort associated with LNP?

NB: at the time of the study, LNP was still developing, so application was not consistent across cohorts, and this will have affected outcomes.

The LNP process has now been altered, including the use of different equipment.

Limitations of the studies

- Detailed behavioural observations were only conducted for the first 6 hours post procedure.
- Behaviours are categorised according to normal or abnormal.
 - Some specific behaviours are scored, but often at low levels.
 - There was no classification of ‘degree of abnormality’.
- Controlled physiological comparisons of LNP versus surgical mulesing were not carried out.

Where to next

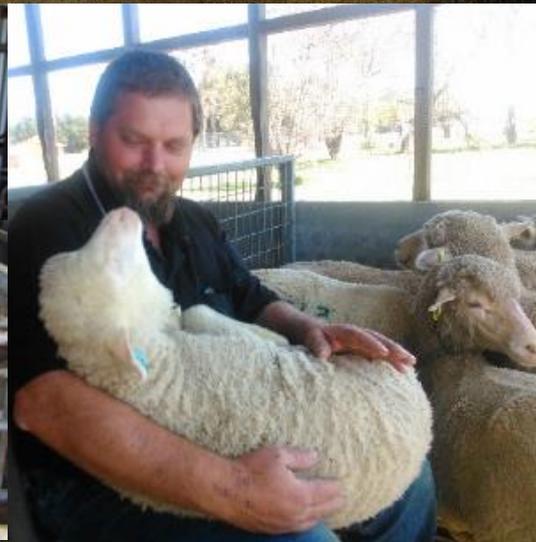
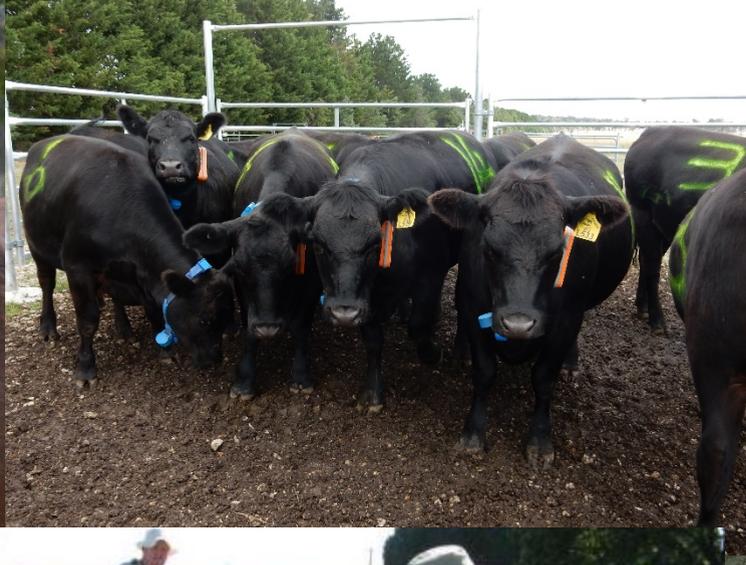
- Achieved: effective pain relief registered for sheep undergoing castration, tail docking and mulesing.
 - Ilium Buccalgesic OTM and Tri-Solfen
 - Demonstrated benefits in first 24 hours post procedure.

What about post 24 hours?

- What other agents/management practices are on the horizon that may improve welfare and assure the consumer?
- We have a lot of information from a number of studies; it's time to take stock.
 - Stocktake review of pain and analgesia research (CSIRO with AWSC, 2018-19)

Acknowledgements







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