

TECHNICAL BULLETIN



Woolly Wellbeing – Why lamb comfort matters

Routine husbandry procedures such as castration and tail docking are well documented sources of significant acute and potentially chronic pain, raising major animal welfare concerns.¹⁻¹⁰ The literature consistently demonstrates that these procedures, when performed without analgesia, result in marked behavioural and physiological distress, including elevated cortisol levels and pain-related behaviours.^{1,3,6,8,10}

Multiple studies and reviews advocate for the use of pain relief, particularly multimodal approaches combining local anaesthetics and non-steroidal anti-inflammatory drugs (NSAIDs), to effectively mitigate both acute and longer-term pain and inflammation.^{1-4,7} While regulatory and practical barriers remain, the consensus is that providing pain relief is both ethically necessary and beneficial for animal welfare, with a favourable safety profile when recommended protocols are followed.^{2,3,7}

The Australian and New Zealand livestock industry is under increasing scrutiny from consumers, regulators, and international markets to demonstrate high standards of animal welfare, including the use of effective pain relief.

This bulletin reviews options, summarises current best practices, and provides recommendations to support and accelerate the adoption of pain relief in sheep production. The goal is to support veterinarians, technical advisors, and farmers in making evidence-based decisions that improve animal welfare, meet compliance requirements, and maintain market access. A farmer friendly version is also available.

Literature Review: Pain, Welfare, and Husbandry Procedures

THE SCIENCE OF PAIN IN LAMBS

Pain Responses

Tail docking and castration cause acute pain, evidenced by behavioural changes (abnormal postures, reduced activity, lying down and vocalisation) and physiological responses (elevated cortisol, heart rate). In the short to medium term ongoing inflammation contributes to variable levels of pain / discomfort.¹⁻¹⁰

The **acute pain phase** is most intense in the first 30–60 minutes after the procedure, but ongoing and chronic pain can persist for days or weeks, especially with ischaemic methods such as rubber rings. **Behavioural indicators** such as abnormal standing, hunched posture, lying down and reduced play are reliable markers of pain.^{1,3,6,8,10}

Chronic pain, is increasingly recognised as a risk, especially when procedures are performed without adequate analgesia.^{3,8,9,10}

Castration Methods

Rubber Ring (Elastrator) Castration is the most common method in Australia and New Zealand. These methods are less invasive than surgical alternatives but still associated with acute pain and distress, especially in the first hour post procedure. Considered less distressing than surgical but still a cause of significant pain for lambs. A tight rubber ring is applied to the scrotum, cutting off blood supply and causing the scrotum and testes to atrophy and fall off. For cryptorchid lambs, the short scrotum method of rubber ring application has been described, rendering the lamb infertile but leaving the testicles in place.¹⁴⁻¹⁹

Surgical Castration causes more prolonged pain and distress, as indicated by behavioural and cortisol responses, and is generally discouraged. Involves excision of the distal scrotum and removal of the testes. This method is rarely used due to welfare concerns and a higher risk of complications and greater pain response. Veterinary involvement and pain relief is required.^{14,15,17,24-26}

Burdizzo (Bloodless Castration): Less commonly used, this clamp crushes the spermatic cords without breaking the skin. It is not as prevalent as the rubber ring method.^{21,23,24}

Tail Docking (Tailing) Methods

Hot Iron (Cautery): The most common method in both Australia and New Zealand, involving the use of a heated device to amputate the tail and cauterize the wound simultaneously.^{15,18}

Rubber Ring (Elastrator): A tight rubber ring is applied to the tail, cutting off blood supply and causing the distal tail to fall off after several days.^{15,18}

Surgical Knife: Rarely used, (banned in New Zealand), involves cutting the tail with a knife.¹⁵

Combined Methods: Some producers use both hot iron and rubber rings.¹⁵

Both hot iron and rubber ring methods can result in prolonged healing times and a high incidence of infection or pus at the wound site.²⁷

Age and Timing

Younger lambs (under 6 weeks) experience less severe pain responses than older lambs, but pain is still significant.

Performing procedures as early as practical, while ensuring the ewe-lamb bond is established, is recommended.

PAIN RELIEF OPTIONS: EFFICACY AND LIMITATIONS

Options for castration and tail docking vary with recommendations best considered from the perspective of short- and long-term pain relief and analgesia. Local anaesthetics significantly reduce acute pain behaviours, but their effect is often short-lived and regarding docking, challenging from a practical perspective. Use of local anaesthetics (e.g., lignocaine) and non-steroidal anti-inflammatory drugs (NSAIDs) is increasingly encouraged and adopted, especially with ring castration. Newer innovations include devices that allow simultaneous administration of pain relief with castration, (local anaesthetic-impregnated bands and devices that combine ring application with anaesthetic injection).^{15,16,20-23}

Local Anaesthetics

- **Lignocaine** (injected) administered before or during procedures can virtually abolish acute cortisol responses and pain behaviours, especially when injected at optimal sites (scrotal neck, testes).^{1-3,7} Devices that allow simultaneous administration of the castration procedure with pain relief improve practicality but may not be effective in desensitising all nerves entering the scrotal sac.
- For tail docking, local anaesthetic is less effective due to anatomical challenges and the complexity of achieving adequate diffusion in the tail tissue.
- **Topical anaesthetics** are effective for surgical wounds but have limited benefit for hot iron or ring tail docking and castration.

Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)

- **Meloxicam** is the most widely used NSAID in sheep, with a long half-life and practical administration routes (oral, injectable).
- NSAIDs provide sustained analgesia and reduce inflammation, with evidence supporting their use for both acute and post-procedural pain.^{2,3,7}
- While NSAIDs are effective for reducing inflammation and providing longer-term pain relief when used alone they are less effective for the acute pain phase immediately after the procedure.



Multi-Modal Analgesia

- Combining NSAIDs with local anaesthetic (multi-modal analgesia) provides better pain mitigation than either alone.^{2,3,7}
- The combination of local anaesthetic and NSAID is considered best practice, especially for castration.
- Practical challenges remain for widespread adoption in tail docking due to anatomical and logistical factors.

Other Options

- **Alpha-2 agonists, opioids, and ketamine** are effective but are not practical for routine use in commercial sheep production due to regulatory, safety, and cost constraints.²⁸
- **Alternative methods** (e.g., Burdizzo clamp, new clip devices) are under investigation but not yet widely adopted.

Safety and Practicality

- The safety profile of meloxicam and local anaesthetics are favourable, with minimal adverse effects reported when used at appropriate doses.^{2,3,7,29}
- Long acting formulations and novel delivery methods (e.g., medicated feed, transdermal patches) are under investigation to address practical challenges in extensive livestock systems.^{2,3}

Current Practice and Improving Adoption

ADOPTION RATES

Attitude to the routine adoption of pain relief across Australia and New Zealand is mixed. Adoption is increasing and is higher for castration compared to tail docking. Rates could be accelerated by acknowledging the differences in pain severity between castration and tail docking.

With castration: encouraging multi-modal analgesia where practical, especially for larger operations or where compliance with international standards is required.

Barriers include cost, logistical challenges, false expectations leading to perceived lack of efficacy (especially for tail docking), and a lack of clear, consistent messaging from veterinarians and industry bodies.

PRACTICAL CHALLENGES

Administration

Local anaesthetic requires skill and time to administer effectively, especially for tail docking. Devices that allow simultaneous administration of procedure with pain relief improves practicality for castration but are less effective for tail docking.

NSAIDs are easier to administer (oral or injectable) but do not address acute pain.

Training and Compliance

- A veterinary prescription and training are required for the use of prescription veterinary medicines (e.g., lignocaine, meloxicam).
- Compliance with record-keeping and auditing requirements can be regarded burdensome for farmers and veterinarians.
- Assistance with clear protocols for record-keeping, auditing, and compliance with local veterinary requirements will assist.

Perceived Benefits

- Some farmers perceive little observable benefit from pain relief, especially for tail docking, leading to low motivation to adopt.
- Production benefits (e.g., improved growth rates, mothering-up) are not always evident in small-scale studies.
- It is important to communicate the veterinary industry's continued commitment to animal welfare, to consumers, regulators, and international markets balancing this with transparency about challenges and progress.
- Encourage consumer and market support for incremental improvements, (e.g., improved local anaesthetic devices, novel or alternative methods),^{11,12} whilst recognising that perfection should not be the enemy of progress.

Discussion

The evidence base for pain relief in lamb husbandry procedures is robust, with high-quality systematic reviews, meta-analyses, and experimental studies consistently demonstrating the efficacy of local anaesthetics and NSAIDs, especially when used in combination.^{1-3,7} The physiological and behavioural benefits are clear, and the safety profile is favourable when protocols are followed.^{2,3,7} However, regulatory and practical barriers, such as the limited options of approved products and challenges in delivering long-acting analgesia in extensive systems, remain significant obstacles to universal adoption.^{2,3} Chronic pain and neuroimmune consequences are under-researched but represent important welfare concerns.^{3,8,9} The literature strongly supports the routine use of multimodal analgesia for all lambs undergoing painful procedures, with ongoing research needed to optimise duration, delivery, and chronic pain management.^{2,3,8}

PAIN RELIEF OPTIONS SUMMARY

PROCEDURE	METHOD	PAIN RELIEF OPTION	EFFICACY/NOTES
Tail docking	Rubber ring Hot iron	Local anaesthetic	Some benefit, but practical challenges for tail application limit utility
		Topical anaesthetic	Limited benefit for hot iron; more effective for surgical wounds
		NSAID	Limited for acute pain; helps with inflammation
Castration	Rubber ring	Local anaesthetic	Effective for acute pain when injected into both sides of scrotum
		NSAID	Useful for longer-term pain, not acute phase
		Multi-modal (local + NSAID)	Best practice, but practical and compliance challenges

Key Contacts and Resources

Australian Animal Welfare Standards and Guidelines:animalwelfarestandards.net.au
Responsible Wool Standard: textileexchange.org

1. Mellor, D., & Stafford, K. (2000). Acute castration and/or tailing distress and its alleviation in lambs. *New Zealand Veterinary Journal*, 48, 33 - 43. 2. Cohen, S., Foss, E., Beths, T., & Musk, G. (2024). An Exploration of Analgesia Options for Australian Sheep. *Animals: an Open Access Journal from MDPI*, 14. 3. Metcalf, L., Lomax, S., Van Der Saag, D., Garg, S., & White, P. (2024). Pain Relief Interventions in Australian Livestock Husbandry: A Review of Animal Welfare and Pain Duration. *Animals : an Open Access Journal from MDPI*, 14. 4. Orihuela, A., & Ungerfeld, R. (2019). Tail docking in sheep (Ovis aries): A review on the arguments for and against the procedure, advantages/disadvantages, methods, and new evidence to revisit the topic. *Livestock Science*, 230, 103837. 5. Sutherland, M. (2011). Painful husbandry procedures and methods of alleviation: a review, 71, 189-194. 6. Leeder, D. (2006). Behavioural responses to castration and tail docking in lambs.** 7. Lizarraga, I., & Chambers, J. (2012). Use of analgesic drugs for pain management in sheep. *New Zealand Veterinary Journal*, 60, 87 - 94. 8. Johnston, C., Whittaker, A., Franklin, S., & Hutchinson, M. (2022). The Neuroimmune Interface and Chronic Pain Through the Lens of Production Animals. *Frontiers in Neuroscience*, 16. 9. Adcock, S. (2021). Early Life Painful Procedures: Long-Term Consequences and Implications for Farm Animal Welfare., 2. 10. Sutherland, M., & Tucker, C. (2011). The long and short of it: A review of tail docking in farm animals. *Applied Animal Behaviour Science*, 135, 179-191. 11. Hynd, P. (2017). Electro-analgesia for sheep husbandry practices: a review. *Animal Production Science*, 57, 801-810. 12. Kania, B., Wrońska, D., & Bracha, U. (2021). Pain, Pathophysiological Mechanisms, and New Therapeutic Options for Alternative Analgesic Agents in Sheep: A Review and Investigation. *Animals : an Open Access Journal from MDPI*, 11. 13. Harris, C., White, P., Mohler, V., & Lomax, S. (2020). Electroencephalography Can Distinguish between Pain and Anaesthetic Intervention in Conscious Lambs Undergoing Castration. *Animals : an Open Access Journal from MDPI*, 10. 14. Harris, C., White, P., Hall, E., Van Der Saag, D., & Lomax, S. (2021). Evaluation of Electroencephalography, Behaviour and Eye Temperature in Response to Surgical Castration in Sheep. *Animals : an Open Access Journal from MDPI*, 11. 15. Kongara, K., Corner-Thomas, R., Bruere, S., Lawrence, K., & Gates, M. (2022). Practices and opinions of New Zealand sheep farmers towards pain management in lambs during castration and/or tail docking. *New Zealand Veterinary Journal*, 71, 8 - 17. 16. Marini, D., Kalinowski, T., & Small, A. (2024). Efficacy of a single central injection of lignocaine at the scrotal neck on the behavioural response of lambs to castration.. *Veterinary anaesthesia and analgesia*. 17. Harris, C., White, P., Hall, E., Van Der Saag, D., & Lomax, S. (2021). Evaluation of Electroencephalography, Behaviour and Eye Temperature in Response to Surgical Castration in Sheep. *Animals : an Open Access Journal from MDPI*, 11. 18. Corner-Thomas, R., Ferguson, M., Kenyon, P., Stafford, K., & Pomroy, W. (2018). Lamb castration and tailing practices in New Zealand: results of a questionnaire., 78, 96-99. 19. Maslowska, K., Mizzoni, F., Dwyer, C., & Wemelsfelder, F. (2020). Qualitative behavioural assessment of pain in castrated lambs. *Applied Animal Behaviour Science*, 233, 105143. 20. Roche, S., Ralston, B., Olson, B., Sharpe, B., Schatz, C., Beaugrand, K., Ross, J., Broomfield, M., Allan, N., & Olson, M. (2024). Efficacy of a Lidocaine-Impregnated Elastator Band for Castration and Tail Docking in Lambs. *Animals : an Open Access Journal from MDPI*, 14. 21. Molony, V., Kent, J., & Robertson, I. (1993). Behavioural responses of lambs of three ages in the first three hours after three methods of castration and tail docking.. *Research in veterinary science*, 55 2, 236-45.22. Kells, N., Beausoleil, N., Godfrey, A., Littlewood, K., Ward, R., & Johnson, C. (2020). Effect of analgesic strategies on pain behaviour associated with combined ring castration and hot iron tail docking in Merino lambs. *Applied Animal Behaviour Science*, 222, 104914. 23. Mellema, S., Doherr, M., Wechsler, B., Thueer, S., & Steiner, A. (2006). Influence of local anaesthesia on pain and distress induced by two bloodless castration methods in young lambs.. *Veterinary journal*, 172 2, 274-83. 24. Kent, J., Molony, V., & Robertson, I. (1993). Changes in plasma cortisol concentration in lambs of three ages after three methods of castration and tail docking.. *Research in veterinary science*, 55 2, 246-51. 25. Lester, S., Dj, M., , W., & Holmes, R. (1991). Cortisol responses of young lambs to castration and tailing using different methods.. *New Zealand veterinary journal*, 39 4, 134-8. 26. Lester, S., Mellor, D., Holmes, R., Ward, R., & Stafford, K. (1996). Behavioural and cortisol responses of lambs to castration and tailing using different methods.. *New Zealand veterinary journal*, 44 2, 45-54. 27. Woods, J., & Adcock, S. (2025). Healing progression of tail docking and ear tag wounds in lambs. *Scientific Reports*, 15. 28. See product insert for indications. 29. Data on file.



To find out more about METACAM visit:
livestockfirst.com.au

See product label for full claim details and directions for use.
Boehringer Ingelheim Animal Health Australia Pty. Ltd.,
Level 1, 78 Waterloo Road, North Ryde, NSW 2113 Australia.
ABN 53 071 187 285. METACAM® is a registered trademark of the
Boehringer Ingelheim Group. ©2025 All rights reserved. AU-RUM-0038-2025.

