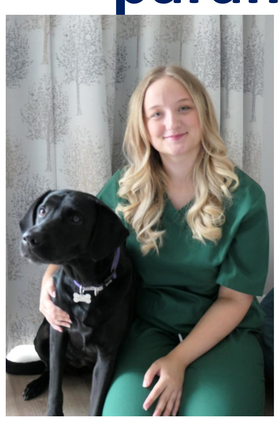
Retrospective study investigating the effects of regional nerve blocks on vital parameters during anaesthesia for canines undergoing dental procedures



Abbey Lock BSc (Hons) RVN C-SQP
abbeylock@outlook.com
and Lucy Evans MSc RVN PG.Cert Vet.Ed FHEA,
Harper Adams University

Introduction

- Effective perioperative analgesia during dental procedures is essential to minimise intraoperative nociception, which can lead to increased inhalant anaesthetic requirements and postoperative pain (Flaherty, 2013; Grubb and Lobprise, 2020).
- Multimodal analgesia, including nerve blocks, is considered best practice in veterinary dentistry (O'Dwyer, 2014). Local anaesthetics, such as bupivacaine and lidocaine, provide regional analgesia by blocking voltage-gated sodium channels in nerve cell membranes preventing nociceptive signal transmission (Mathis, Schilling and Lobprise, 2025).
- Studies in feline patients have demonstrated reduced physiological responses and isoflurane requirements following nerve block administration (Aguiar *et al.*, 2015); however, comparable evidence in canine patients remains limited. This study therefore aimed to address this research gap.
- Study objectives:
  - Assess the effect of regional nerve blocks on heart rate, respiratory rate, and mean arterial pressure.
  - Evaluate the effect of nerve blocks on inhalational agent requirements

Methods

- Patient data was retrospectively collected from clinical records (July 2025-January 2026).
- Twenty-eight canines met the inclusion criteria, with no age or weight restrictions; however, only canines with an ASA status of ≤II were included to minimise the influence of systemic disease (Portier and Ida, 2018; Grubb and Lobprise, 2020).
- Nine patients received bupivacaine or lidocaine nerve blocks to appropriate oral sites using recognised techniques by the Veterinary Surgeon.
- All patients received a standardised premedication, anaesthetic protocol and postoperative analgesia. Heart rate, respiratory rate, and mean arterial pressure (MAP) were evaluated perioperatively; however, MAP was only analysed intraoperatively because routine pre- and postoperative measurements were not commonly available.
- Highest and lowest isoflurane vaporiser settings were recorded to assess inhalant anaesthetic requirements.
- Ethical approval and practice consent were obtained to access anonymised clinical records.

Key Findings

- **Heart rate**: Lower mean HR was observed in the nerve block group at the end of the procedure (80±18.4bpm vs 84±19.4bpm), although this was not statistically significant (p= 0.601).
- **Respiratory rate**: Both groups had the same median respiratory rate at the end of the procedure. Postoperatively, RR was lower in the nerve block group (20 (9) vs 24 (10) breaths/min (IQR)), although this difference was not statistically significant.
- **Mean arterial pressure**: Mean MAP was slightly higher in the nerve block group compared to the control (83.2 ± 10.6 vs 81.8 ±16.9 mmHg), with no statistically significant difference (p= 0.389). This may reflect reduced inhalant anaesthetic requirements and consequently less isoflurane-induced hypotension (Quinn, 2019).
- Both **highest and lowest isoflurane** levels were lower in the nerve block group:
  Highest: 1.78 ± 0.53% vs 2.19 ± 0.53%
  Lowest: 1.06 ± 0.32 vs 1.38 ± 0.52%
  Neither difference reached statistical significance

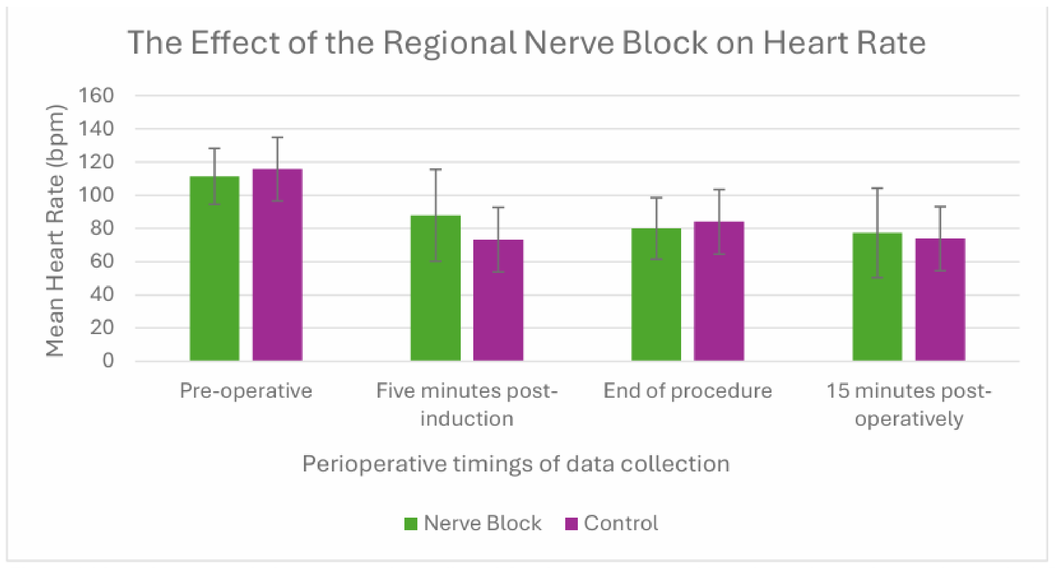


Figure 1 Mean heart rate in beats per minute (bpm) for the two groups throughout the perioperative period. Error bars represent standard deviations.

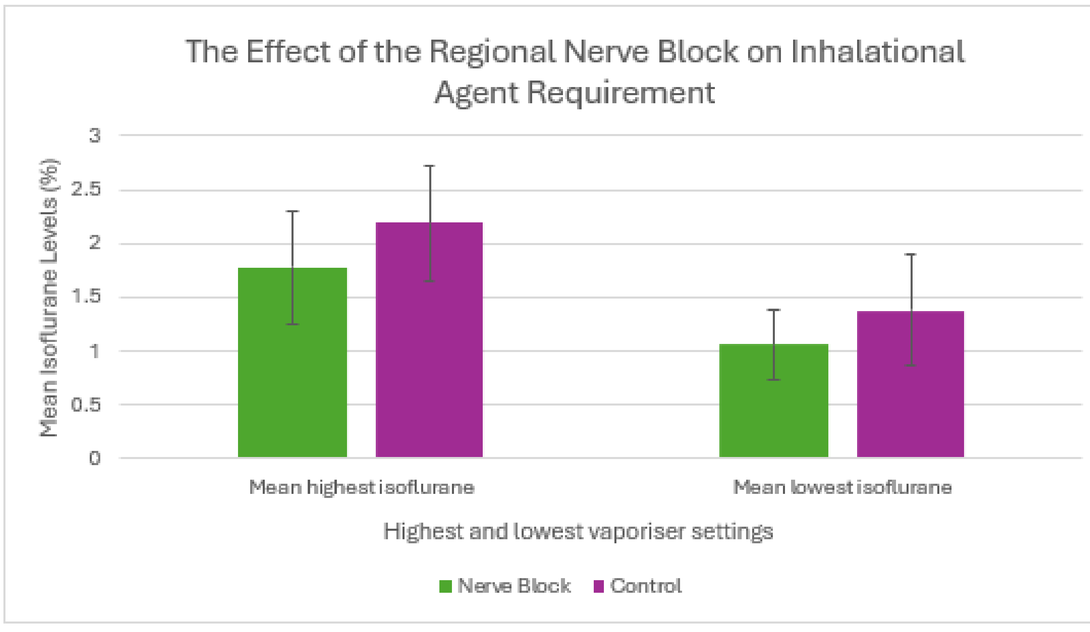


Figure 2 Mean highest and lowest isoflurane settings in percentage (%) between the two groups during the procedure. Error bars represent standard deviation.

Discussion/Conclusion

- Whilst results showed no statistical significance, favourable trends in physiological parameters and consistently lower isoflurane requirements were observed in the nerve block group, suggesting an analgesic and anaesthetic-sparing effect may have been seen with a larger sample size.
- Reduced inhalational anaesthetic exposure may help minimise dose-dependent cardiovascular and respiratory depression.
- 7/8 cases requiring rescue analgesia were from the non-nerve block group, suggesting a potential reduction in additional analgesic requirements, warranting further investigation.
- The influence of stress, anaesthetic drugs and individual patient factors may limit physiological parameters as an indicator of analgesic efficacy.
- Further prospective research with larger sample sizes, standardised protocols and validated pain-scoring assessment is warranted.

Acknowledgements

Thank you to Millennium Vets for letting me carry out my research project at their practice, this project wouldn't exist without that.

References

Aguiar, J., Chebroux, A., Martinez-Taboada, F. and Leece, E.A. (2015) *Journal of Feline Medicine and Surgery,* 17(2), pp. 110–116.
Flaherty, D. (2013) *The Veterinary Nurse,* 4(2), pp. 82–87.
Grubb, T. and Lobprise, H. (2020) *Veterinary Medicine and Science,* 6(2), pp. 218–234.
Mathis, J., Schilling, E. and Lobprise, H. (2025) *Journal of Veterinary Dentistry,* 42(1), pp. 10–23.
O'Dwyer, L. (2014) *The Veterinary Nurse,* 5(10), pp. 574–579.
Portier, K. and Ida, K. (2018) *Frontiers in Veterinary Science,* 5(204).
Quinn CT. (2024) Australian Veterinary Journal. 102(5):264-273.