

Evaluation of EEG to procedural pain of tail docking with and without analgesic intervention

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Electroencephalography (EEG) offers a practical way of measuring the pain response and efficacy of analgesia in livestock. This study aims to evaluate the EEG response of tail docking in conscious sheep with and without the administration of analgesic intervention with the purpose of validating this method for future studies. Six lambs were sourced from The University of Sydney teaching flock. Tri-solfen® was administered to all treatment groups upon completion of the experiment. Animals were randomly allocated into treatment groups; surgical hot iron tail docking (HIT) (n=4), or rubber ring tail docking (n=2). For HIT one of the following analgesic interventions was applied; Lignocaine administered to the tail at docking site, Tri-solfen applied post-surgically to the wound site, tri-solfen and Lignocaine, or no analgesic intervention (as per standard industry practice). Rubber ring lambs were given lignocaine administered to the tail at docking site or no analgesic intervention. Baseline EEG data was recorded for 5 minutes prior to treatment, during the procedure and 5 minutes post-procedure. Data was manually scanned and movement and noise artefacts rejected from analysis. 10 second epochs were used to calculate total power (F_{Tot}) in mV^2 using specially written software in Matlab (Mathworks®). Significant interactions between treatment and time ($P < 0.001$) were observed in all bandwidths for all treatments. There was a significant difference ($P < 0.001$) between HIT and rubber ring tail docking post-procedure regardless of analgesic intervention. Preliminary results show a difference between tail docking methods, likely due to the nature of differing pain pathways. Differences between analgesics treatments indicates potential for this method to determine the efficacy of pain management methods. Further replication of analgesic treatment groups is required. Preliminary results suggest there is potential for the use of EEG in differentiating analgesic use for tail docking lambs.