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**ALLEVIATION OF THE DISTRESS CAUSED BY  
RING CASTRATION PLUS TAILING OF LAMBS  
AND DEHORNING OF CALVES.**

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fulfilment of the requirements  
for the degree of  
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## Abstract

There is increasing social and economic pressure to improve the welfare of animals in our care. In the present study plasma cortisol concentrations were measured to assess the pain-induced distress caused by ring castration plus tailing in lambs and dehorning in calves and the extent to which the distress caused by these procedures can be reduced by using different alleviation strategies.

Local anaesthetic injected into the neck of the scrotum just before ring application significantly reduced the cortisol response to ring castration plus tailing in lambs, but local anaesthetic injected into the testes just after ring application only marginally reduced this response. A castration clamp was applied across the full width of the scrotum of lambs for 6 or 10 seconds after ring castration plus tailing to disable the innervation from the scrotal area. The application of the castration clamp for 6 seconds after placement of the ring did not reduce the cortisol response to ring castration plus tailing, whereas application for 10 seconds slightly, but significantly, reduced the peak cortisol concentration. Healing of the castration wound was not complicated by the application of the castration clamp after ring castration plus tailing. Therefore injecting local anaesthetic into the neck of the scrotum just before ring castration plus tailing significantly alleviates the pain-induced distress associated with ring castration plus tailing, but applying the castration clamp in combination with ring castration plus tailing has little benefit.

Local anaesthetic given prior to dehorning virtually abolishes the cortisol response to dehorning for the duration of action of the local anaesthetic, but once the local anaesthetic wears off cortisol concentrations increase resulting in a delayed cortisol response equivalent to the overall cortisol response to dehorning when local anaesthetic is not used. This delayed cortisol response is thought to be stimulated by inflammation-related pain. The non-steroidal anti-inflammatory drugs (NSAIDs) ketoprofen and phenylbutazone and an endogenous cortisol surge stimulated by injecting ACTH were used to assess

whether this delayed cortisol response is associated with inflammation-related pain. Local anaesthetic (5 hour duration of action) plus ketoprofen given prior to scoop dehorning marginally reduced the delayed cortisol response observed once the local anaesthetic wore off, but giving local anaesthetic and phenylbutazone prior to dehorning had no significant effect on this delayed cortisol response. The antinociceptive action and a greater anti-inflammatory potency of ketoprofen compared to phenylbutazone may explain why ketoprofen was more effective than phenylbutazone in reducing this delayed cortisol response. ACTH plus local anaesthetic given prior to dehorning only marginally reduced the delayed cortisol response observed once the local anaesthetic wore off, suggesting that the delayed cortisol response seen when the local anaesthetic wears off is not due primarily to inflammation-related pain

Giving local anaesthetic prior to dehorning and cauterising the amputation wounds prevented the delayed cortisol response after the local anaesthetic wore off and significantly reduced the overall cortisol response to dehorning.

Thus, in the present study long acting local anaesthetic (5 hour duration of action) in combination with NSAIDs had minimal alleviating effects on the pain-induced distress caused by dehorning compared to local anaesthetic alone, but local anaesthetic and cautery provided effective pain-relief.

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