

Activity of ewes before lambing differs depending on lambing difficulty

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Lambing is a period of increased risk for both ewes and lambs (Dwyer, 2008). This is especially true for ewes carrying large single foetuses, or multiple foetuses (Everett-Hincks et al., 2005). A difficult and/or prolonged labour- known as dystocia- is the biggest contributor to neonatal lamb losses in Australia (Refshauge et al., 2016). It is therefore important to monitor the lambing process as closely and for as many ewes as possible. Direct observations are time-consuming and labour intensive. On-animal sensors provide an attractive alternative, recording the labour process continuously, for post-hoc analysis. As a research tool, sensor-based behaviour measurement could greatly reduce the time and effort spent on behaviour analysis compared with traditional video annotation or direct observation methods. There is also the possibility of developing sensor capability further for real-time identification of labour difficulties, providing early intervention opportunities.

In this study, a group of pregnant ewes ($n = 70$) were fitted with an ActiGraph tri-axial accelerometer around the neck. Lambing ewe behaviour was recorded by constant video surveillance with day- and night-vision cameras. Based on observer classification and duration of stage 2 of parturition, 15 data sets were selected for birth events classified as normal ($n = 9$) or difficult ($n = 6$). Accelerometer data was analysed for a period of 5.5 h before birth, using ActiLife v6.13.3 (ActiGraph Corp, Pensacola, FL, USA). The metric used for this analysis was “activity” and had two levels; sedentary and active. The ‘sedentary’ category in this context is the equivalent to resting, and may include both quietly standing and laying down. The ‘active’ category included light and moderate activity levels. For both birth types, the average percentage of time spent in both activity levels was calculated (Figure 1). Student’s t-tests were used in Genstat (VSN International, 2019) to compare the percentage of time spent in each activity level between the two birth types; and between activity levels for both birth types.

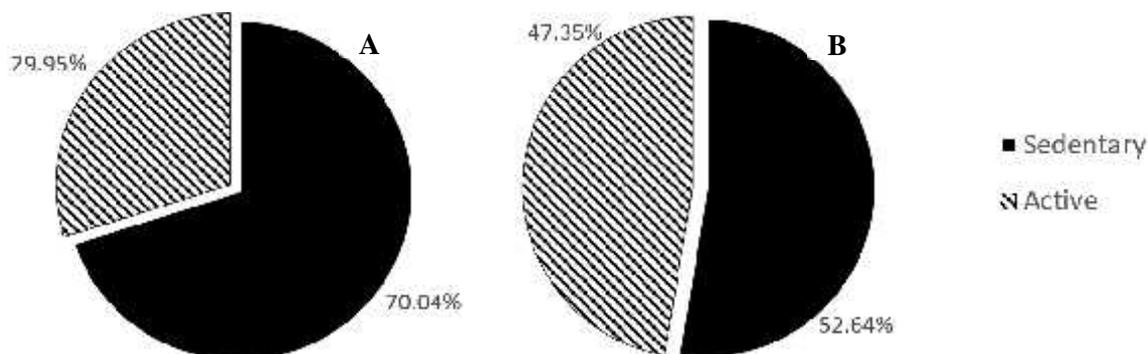


Figure 1 Average percentage of time spent sedentary and active in the 5.5h before birth for ewes with normal (A) and difficult (B) labours.

Ewes with a normal labour spent significantly more time sedentary than active in the 5.5 h prior to birth ($P < 0.001$), whereas ewes with a difficult birth spent equivalent time sedentary and active in the same period ($P = 0.28$). Correspondingly, ewes with a difficult labour spent significantly more time active than ewes with a normal labour in the 5.5 h leading up to birth ($P < 0.001$).

These results show that there is an observable difference in activity between ewes experiencing a normal labour and ewes experiencing a difficult labour in the 5.5 h before the lamb is born. It is also shown that accelerometers are able to capture this difference when mounted on the neck of the ewe. Animal-mounted accelerometers show promise in the behavioural research space. Further refinement of these devices could replace the need for traditional behavioural observation methods.

References

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