

## **A sequential analysis of body regions and body positions during mechanical brush use by dairy cattle**

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The aim of this study was to evaluate cow's body postures associated with brushing the different body regions with a view to investigating how they might experience grooming by mechanical brushes. A mixed group of 72 Holstein and Swedish Red cows in a loose housing system with access to two brushes were observed during 20 days, comprising 10 different scan periods of 30 min each of continuous detailed observations. Every 15 seconds we observed which part of the body was brushed (head, neck & withers, belly, hind quarters) and which ear position (axial, forward, back up, back down, asymmetric) neck position (horizontal, above horizontal, below horizontal, down) and tail position (no wagging, small wagging, directed wagging, vigorous wagging and bent side) they showed. A sequential analysis of the body region and position was applied followed by Pearson residuals of four-way cross tabulation. Cows spent most time brushing their hindquarters (head 11%, neck 18%, belly 15% and hind 55%). When switching from brushing one region to another, the following region was most likely to be the region towards the hindquarters supporting that cows brush from head to tail. The most frequent ear positions while brushing were 'back up' (44%) and 'axial' (31%), the most frequent neck position was 'horizontal' (47%) and the tail was most like to be 'not wagging' (52%). There were also specific combinations of ear, neck and tail positions that occurred significantly more often than others, or only occurred when brushing specific regions. Tail bent to the side was only associated with the cow brushing the hind quarters and the 'axial' ear position, which has been associated with relaxed positive situations. Vigorous tail wagging was correlated with brushing the neck/withers/belly regions and the ears were in positions associated with alertness e.g. ears forward. In summary these results show a clear order of brushing the body with a preference for the brushing the hind quarters and we speculate that specific posture combinations might reflect different levels of arousal while experiencing a positive emotional state.

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