Time Taken for Lame and Non-lame Sows to Stand and Lie

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Summary and Implications

This study aimed to characterize the postures and movements of the lying down sequence in multiparous sows, and to identify possible differences between lame and non-lame sows. Eighty-five multiparous sows were moved from their gestation housing to a gestation stall where they were video recorded for one lying down–standing up event on days 30, 60 and 90 of gestation. The digital video camera was positioned on the adjacent stall so the sows' profile was visible while recording. Observations ceased when the sow successfully lied down and stood up or if 2.5 hours elapsed since recording began. Prior to recording, sows were scored for lameness on a 3-point scale, (1 = normal to 3 = severely lame). From the video, postures and movements that occurred during the lying-standing sequence were identified. Lameness was not associated with any of the traits studied. However, a tendency to spend less time standing was observed in lame sows suggesting that lameness recorded in this study was not severe enough to affect the sequence.

Introduction

The pig lying down and standing up sequence was first described by Baxter and Schwaller (1983). These authors suggested that locomotory problems would cause few behavioral alterations during this sequence. However, several studies have reported that sows with moderate to severe lameness are likely to show uncontrolled lying down sequences and spend more time lying down than non-lame sows. To our knowledge, there are no studies that describe the rising and lying down postural sequences in lame and non-lame sows. Therefore, the objective of this study was to determine the time taken to perform postural changes during a standing-lying and lying-standing sequence in multiparous sows when lame and non-lame.

Materials and Methods

The protocol for this work was approved by the ISU-IACUC committee. This work was conducted from August 2015 to June 2016.

Animals: Eighty-five multiparous crossbred and Yorkshire sows (parities 1 to 4), were moved from their home stall to a testing stall on 30, 60 and 90 days of gestation.

Walking Lameness: Sows were scored for walking lameness on a 3-point scale when moving between their home stall and the testing stall (Table 1).

Behavioral equipment: A digital video camera (GoPro Hero, GoPro Inc., San Mateo, CA, USA) was positioned on the adjacent stall next to the test stall by a camera clamp, approximately 51 cm from the floor.

Digital video recording: The video provided a continuous sow side profile**.** Observations ceased when the sow successfully laid down (defined as the sow lying in either sternal or lateral recumbency not supported by any of her legs) and stood up or if 2.5 hours elapsed. Sow postures and movements that occurred during the lying-standing sequence were identified (Table 2).

Statistical Analysis: Data were analyzed using mixed model equations in SAS PROC MIXED. Models included; walking lameness score (1, and ≥2), gestation day (30, 60 and 90), and parity (1, 2, and ≥3). Significance levels were set at $P \leq 0.05$, and tendencies were noted at $P \leq 0.10$. Each sow was considered the experimental unit.

Results and Discussion

Walking Lameness: Lame sows tended to take 2.6 seconds longer during KSR and LATENCY was quicker (15.7 minutes) compared with non-lame sows ($P \leq 0.10$). Lameness status did not affect SRHQ, TLIE TLS, TSR and TRISE ($P \geq 0.10$).

Gestation Day: Gestation day effected TLS, with sows taking longer at 60 days of gestation than on 30 and 90 days of gestation respectively ($P < 0.05$; Table 3). At 90 days of gestation sows tended to take longer to perform KSR than at 30 days of gestation ($P \leq 0.10$; Table 4). TSR, TRISE SRHQ, TLIE, and LATENCY were not affected by gestation day ($P \geq 0.10$).

Parity: Parity was not observed to be a source of variation in any aspect of the lying sequence or LATENCY. However, when standing, parity 2 sows took 16 seconds longer than parities 1 and ≥3 sows during TLS ($P < 0.05$) and TRISE tended to take longer by 9 and 7 seconds than parity 1 and ≥3

sows, respectively ($P < 0.10$). TSR did not differ between parities ($P \geq 0.10$).

Lameness status was not associated with time to perform the different movements within the lying sequence. The discrepancy between our results and previous reports could be due to lameness recorded in this study not being severe enough to affect the lying down sequence. In regards to the differences found in the rising up sequence the biological relevance remains to be explained.

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Table 1. Walking lameness scoring scale

Score	Description	Definition
1	Normal	Sow moved with unaltered gait on all limbs
2	Moderately lame	General stiffness, altered gait on affected limb(s)
3	Severely lame	Non-weight bearing on affected limb(s)

Table adapted from Calderon Diaz et. al 2015

Table 2. Ethogram of postural changes

Measure	Acronym	Unit
Lying sequence		
Kneeling to rotating shoulder to rest on the floor	KSR	Seconds
Shoulder rotation to lowering hind quarters onto the ground	SRHQ	Seconds
Total time to perform a successful standing to lying sequence	TLIE	Seconds
Time from entrance into test stall to successfully lying down	LATENCY	Minutes
Standing sequence		
Extending front legs forward from body and pushing head and shoulders off the ground to end in a sitting position	TLS	Seconds
Sitting with weight on front feet and hams on the ground to lifting hind end off the ground	TSR	Seconds
Total time to perform the rising process	TRISE	Seconds

Table 3. Gestation day on TLS in multiparous sows (seconds)

Gestation Day	TLS	SE
30	8.56[a]	2.5
60	15.91[b]	2.8
90	6.53[a]	3.7

[a, b] signifies differences within column at $P < 0.05$

Table 4. Gestation day on time KSR in multiparous sows (seconds)

Gestation Day	KSR	SE
30	11.29	1.6
60	12.99	1.7
90	16.87	2.1

[a, b] signifies differences within column at $P < 0.0$