



Case Report

Case study: Treatment of oral and locomotory stereotypic behaviors in a mature sow

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ABSTRACT

A 32-month-old female 225-kg nonpregnant cross-bred Newsham sow presented a 6-week history of stereotypic behaviors when housed in a laboratory research facility. A behavioral examination over 12 daylight hours revealed 3 main stereotypic motor patterns, namely (1) oral-nasal gate manipulation defined as placement of the snout between the bars of the pen gate with repetitive, forceful up and down movement; (2) head weaving defined as repetitive lateral head and snout movement toward the pen gates while rocking back and forth on her forequarters with hooves remaining on ground at all times; and (3) body weaving defined as repetitive shifting of body weight from one side to the other with front hooves lifting alternately off the ground. The sow performed the oral-nasal gate manipulation and head and body weaving 4.0%, 12.4%, and 6.8% of her total baseline time budget, respectively. The presumptive diagnosis was oral-nasal and locomotory stereotypies. Three treatments were used to mitigate the duration and frequency of these stereotypic behaviors. Treatment 1—Social treatment (change social stimuli by providing visual and nose-to-nose contact with different neighboring sows); Treatment 2—Forage treatment (change foraging substrates by providing peat moss as a rooting substrate); and Treatment 3—Space treatment (change pen configuration by increasing space). The sow performed the oral-nasal gate manipulation and head and body weaving 0%, 0.4%, and 0.1% of her total time budget, respectively; social treatment: the sow performed the oral-nasal gate manipulation and head and body weaving 0.9%, 15.3%, and 11.3% of her total time budget, respectively; and forage treatment: the sow performed the oral-nasal gate manipulation and head and body weaving 0.5%, 28.0%, and 15.5% of her total time budget, respectively. This study is one of the first reports to evaluate the treatment of established stereotypies in a mature sow. Results suggest the promise of environmental enrichment as an effective treatment strategy. Further research is needed to evaluate the persistence of these behavioral changes and relative importance of different environmental manipulations provided.

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Case presentation

A 32-month-old, 225-kg (495-lb), nonpregnant, cross-bred Newsham sow presented with abnormal behavior 2 days after arrival to a laboratory research facility at Iowa State University. The main complaint from the caretaker was abnormal head and body weaving directed toward the front or side metal gates of the pen.

The sow was housed individually in a pen that measured 3.7 m long × 1.4 m wide × 1.2 m high. A rubber mat (3.5 m long × 1.3 m wide) was provided for comfort, but no other bedding material was provided. The sow was able to move around freely, turn around, and lie down in its pen. Metal gates were affixed at the end of each home pen, and the sow was able to see outside the front and sides of the pen. Sows were housed in the adjacent right and left pens, but there was no sow housed in the pen immediately across the 0.61-m alley. The sow had *ad libitum* access to water via 1 nipple drinker and was hand-fed a custom-mixed diet composed of corn, soybean meal, and soy hulls. A daily total feed ration of 2.7-kg feed was split between morning and afternoon feedings. Matrix (Altre-nogest; 6.8 mL; 15 mg) was added to 1 kg of feed daily to prevent estrus initiation.

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History

Source farm history

According to the original source farm, no abnormal behaviors were noted in the sow's history or records. On farm, the sow was housed individually in a 0.61-m wide × 2.1-m long gestation stall. She was limit-fed a commercial diet composed of corn and soybean meal once a day. The sows' reproductive history is as follows: 116 average days of gestation, 143-day farrowing interval, 14.6 average piglet number born alive, and 24.8 piglets/litter/year. The sow was provided no access to enrichment material (straw, sawdust, and so on) while on farm. One week before transport to the laboratory, the sow was group housed in a 6.1-m long × 2.4-m width concrete pen with 11 other sows that were transported to the laboratory facility. Transportation time was approximately 50 minutes and no adverse events were noted during transportation.

Laboratory history

Two cohorts of 12 sows were transported from a local commercial sow unit and enrolled in a clinical lameness trial for 7 weeks. Selection criteria for trial enrollment included multiparous, nonpregnant, and non-lame sows with no clinical health abnormalities. On arrival, all sows underwent a 7-day program where they were acclimated to laboratory facilities and equipment. This acclimation included handling, moving sows individually through the laboratory, and restraint. All procedures associated with handling and restraint involved positive reinforcement through food rewards. Among all 24 sows enrolled in the study, only this sow demonstrated stereotypic behaviors while housed in her home pen.

Physical evaluation

An initial physical examination was performed on the sow on arrival to the laboratory. The physical examination was unremarkable and included lung and heart auscultation, rectal temperature, and reproductive tract ultrasonography. An 8 × 7-cm triangular alopecic area located on the dorsal aspect of the neck and a 3-cm soft tissue callus on the dorsal aspect of the nasal bone were noted during the physical examination. These lesions suggest that stereotypic behavior may have been occurring on farm before arrival to the laboratory. The sow had a body condition score of 3 [defined as "ideal" on a 1-5 scale (Pork Quality Assurance Plus, 2013)].

Behavioral evaluation

Approximately 1 week after arrival, a veterinarian and a behavior consultant evaluated the sow's behavior. To define abnormal behaviors, video recording of the sow was conducted over a 12-hour period (6:00-18:00) using continuous behavior sampling methods (Altmann, 1974). Behaviors were evaluated using two 12-V color Close Circuit Television Panasonic cameras (Model WV-CP484; Matsushita, Co., Ltd., Osaka, Japan), positioned centrally (2.9 m from the front of the pen) using an elbow bracket at a height of 2.8 m from the floor. Video was captured digitally using a Noldus portable laboratory (Noldus Information Technology, Wageningen, NL). The cameras were fed into a multiplexer, which then allowed the image to be recorded onto a PC using HandiAvi (version 4.3, Anderson's AZendant Software, Tempe, AZ) at 30 frames per second. A computer screen was used to view the DVR output to ensure picture clarity and camera positioning before each behavioral recording. Behaviors of interest were identified and defined (Table). The duration of each behavior was quantified based on percent of time

Table

Behavioral ethogram of normal and abnormal sow behaviors

Measures	Description
Head weaving	Includes when sow is positioned at pen gates and rocks back and forth on her forequarters while pivoting her head and snout side to side.
Body weaving	Includes when sow is positioned at pen gates and takes 3 consecutive steps to the right or left direction and includes crossing of the forelimbs.
Oral-nasal gate manipulation	Includes when sow inserts mouth and/or snout in between the opening of the pen doors and forcefully pushes gate up and down.
Inactive	Includes sitting with front limbs extended and bearing weight and rear legs on the ground or lying down with all 4 limbs and body in contact with the floor.
Active	Includes standing with all limbs extended and bearing weight on the ground or walking with limbs in both extension and flexion and moving through the pen
Maintenance	Includes foraging (defined as rooting, licking, and exploratory behaviors directed at feed trough or ground), urinating, and/or defecating.
Unknown	Includes anytime the sow is out of pen or camera malfunctions and behaviors of sow cannot be identified.

the behavior was conducted over the 12-hour video period and was considered the sow's baseline time budget (Figure). The sow's abnormal behavior was categorized into 3 main behavioral motor patterns as described in the following paragraphs.

Oral-nasal gate manipulation

The sow placed her mouth and/or snout in between the opening of the pen gates and forcefully pushed the gate up and down repetitively. During the baseline 12-hour video evaluation, the sow performed this behavior for 4.0% of her total time budget, spending on average 3 seconds manipulating the gate per bout (bout defined as starting with visible movement of gate with head contact and ending when head is no longer in contact with fence for 2 seconds), with a total of 607 bouts of gate manipulation over the 12-hour period.

Head weaving

The sow positioned her head 0.61 m from the ground and conducted repetitive lateral head and snout movement toward the pen gates while rocking back and forth on her forequarters with hooves remaining on ground at all times. The sow did not perform oral

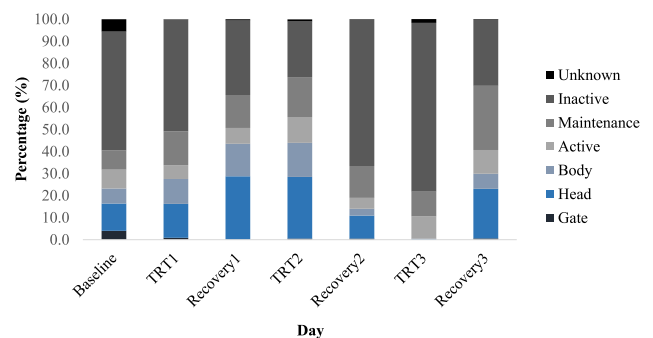


Figure. Time budget (%) for an individual sow exhibiting stereotypic behaviors during a 12-hour observation period on baseline, treatment, and recovery days. Unknown behaviors include sow out of pen or camera visual and/or camera malfunction; maintenance behaviors (Maintenance) include foraging, urinating, and/or defecating; body weaving behavior (Body); head weaving behavior (Head); and oral-nasal gate manipulation (Gate).

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