Practical Environmental Enrichment Strategies for Piglets



Hayley Bowling, Western College of Veterinary Medicine Jennifer Brown, PhD, Research Scientist -Prairie Swine Centre During the summer of 2018, undergraduate student Hayley Bowling carried out a research project at the Prairie Swine Centre that examined effective and practical ways of enriching piglets in farrowing

and nursery. Recent interest in environmental enrichment stems from the National Farm Animal Care Council's 2014 update to the Canadian Code of Practice for the Care and Handling of Pigs which states that all pigs must have "multiple forms of enrichment that aim to improve the welfare of the animals through the enhancement of their physical and social environments." Pens in commercial barns severely restrict pigs' innate foraging behaviours. The lack of enrichment can lead to problematic behaviours such as tail-biting and belly-nosing and there is a need for practical and cost-effective solutions that producers can implement.

Pigs are intelligent and curious from birth, and the lactation and nursery periods are critical for their mental and physical development. Despite this, research on suitable enrichments for piglets is lacking. Research that has been done found that piglets given enrichment had increased play and exploratory behaviours and decreased aggression, tail-biting, and belly-nosing. There is also some evidence of improved growth and meat quality when pigs are given enrichment, so there is potential for enrichment to benefit production as well as welfare.

Unfortunately, most previous research on enrichment for pigs has been done using substrates such as straw. While straw is effective and attractive to pigs, it isn't feasible for most Canadian barns because of biosecurity risks and slatted flooring systems. The project therefore looked at enrichment alternatives such as commercially available pig toys hung from chains, segments of PVC pipe, hanging knotted cotton rope, rubber mats, and hay cubes. To help maintain pigs' interest, three or four objects were provided at once, and the set of enrichments was rotated twice per week.

Thirty litters were used for the experiment: ten litters received enrichment only in the nursery (from 4-8 weeks of age), ten received enrichment both pre-weaning and in the nursery, and ten received no enrichment. All piglets were weighed shortly after birth, at weaning (approximately 28 days of age), and at 8 weeks. Video cameras were used to record piglet behaviour in their nursery pens at weaning, two weeks post-weaning, and four weeks post-weaning. Skin lesions were recorded before weaning, 24 hours post-weaning, and four weeks post-weaning. Finally, the pigs' fear of humans was assessed by measuring their latency to approach and contact a human. Results showed that piglets given enrichment before weaning

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showed less pen-mate manipulation (tail-biting, ear-biting, belly-nosing, etc.) and tended to fight less at weaning than the other pigs. This is important because weaning is stressful for piglets, so anything that can help to reduce weaning stress has the potential to benefit their health, welfare, and productivity throughout the nursery and beyond. Similarly, piglets that were given enrichment only in the nursery had fewer head and shoulder lesions at four weeks post-weaning than the other groups, indicating that they fought less towards the end of the nursery phase.

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Figure 1: Study 1. Overall navigation time after treatment. Average of chute runs at 15, 40, 60 and 120 minutes post-treatment (LS means \pm SEM in sec) for pigs given one of five treatments. Treatments: CA: castration control; CAA: castration with ketoprofen; CAM: castration with meloxicam; CAP: castration with paracetamol; and SCA: and sham castration. Bars with different superscripts are significantly different, P \leq 0.05.

those that were sham castrated, with piglets given pain control being intermediate. Studies 2 and 3 also showed an increase in cortisol concentrations following castration with higher levels in castrates compared to sham castrates. Comparing cortisol responses in pigs castrated at 3 and 10 days of age, older piglets showed lower cortisol levels overall and a greater effect of analgesia on reducing cortisol levels. In Study 3, providing analgesia 1 h before castration resulted in significantly lower cortisol levels compared to pigs that did not receive analgesia. Providing analgesia immediately before castration was also significantly better than providing no analgesia, but was not as effective as provision at 1 hour prior. We conclude that the analgesic, ketoprofen, has a positive effect on reducing pain following castration when given 30 minutes to 1 hour before castration. Drug provision immediately before castration appears to be better than providing no pain control. Older piglets showed a clearer response when given pain control than young piglets, and could be used as a model for evaluating pain control options.

Conclusions

A number of conclusions and recommendations can be drawn from this project. First of all, we can conclude that, based on this work and previous studies, both meloxicam and ketoprofen can reduce cortisol levels following castration. In addition:

- 1. Providing ketoprofen 1 h before castration is more effective than administering the drug immediately before castration.
- 2. Pigs castrated at 10 days of age show lower cortisol levels in response to castration than pigs castrated at 3 days.
- 3. Providing ketoprofen to pigs castrated at 10 days of age had a greater effect on reducing pain than providing ketoprofen to pigs castrated at 3 days of age.
- 4. The handling chute used as a behavioural measure in these studies is of limited value.

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Additionally, pigs with enrichment spent more time exploring their pens at three weeks post-weaning, indicating that they were more engaged with their surroundings. Pigs enriched post-weaning also showed reduced fear of humans, which has implications for both welfare and ease of handling. No difference in growth between the groups was found, however previous research indicates that the effects of early enrichment on growth are be greater later in the pigs' lives. Pigs in this trial were not followed after 8 weeks of age. Therefore, more research should be carried out regarding the long-term growth and welfare effects of enrichment.

Of the objects used, the hanging knotted cotton rope was the most popular. Pigs are known to prefer malleable objects that they can chew and destroy because these qualities allow them to express their instinctive rooting and foraging behaviours. The attractiveness of the rope and its low cost make it a viable alternative to substrates such as straw. However, the drawback of destructible enrichments such as rope is the fact that they need to be replaced regularly, which may make them more labour intensive than something that can be used for a longer period of time. If a more durable option is desired, commercial pig toys hanging from chains were also attractive to the piglets and required significantly less labour, however they involve a higher initial cost. Both the rope and the pig toys had the advantage of being suspended off the ground and were not soiled by feces, unlike the rubber mat and PVC pipe which were placed on the floor of the pen.

This study indicated that for producers looking to implement physical enrichment in their barns, a rotation of several inexpensive objects can be effective to increase exploration and reduce manipulation of pen-mates among piglets. Environmental enrichment for piglets is an exciting area of research because it also has potential to improve pig health, productivity, and public perception of the swine industry as a whole.

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