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Welfare implications of prolonged cow-calf contact in dairy farming

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Summary

It is standard practice on dairy farms to remove calves from the dam shortly after birth, after which they are individually housed for the first days or weeks of life and fed limited milk allowances. This practice has become a topic of public and scientific discussion. First, there is growing evidence showing that the current early life environment in standard rearing practices may limit calves' physical, behavioural, and cognitive development. Second, early cow-calf separation itself deprives much of cows' natural maternal behaviour. Alternative calf rearing systems that re-introduce (prolonged) maternal contact into dairy production systems are currently receiving increasing interest from various stakeholders. Allowing for prolonged cow-calf contact (CCC) has been proposed to enhance animal welfare, as such rearing conditions more closely resemble the social and nutritional environments known under natural settings. Yet, little is known about how different types of prolonged CCC (i.e. full contact or partial contact) can contribute to optimization of calf rearing conditions in a farm setting with respect to animal welfare. Partial contact that allows for limited cow-calf interactions without suckling may possibly better suit the current dairy production system, although full contact that includes suckling allows for more natural behaviour to occur.

The aim of my thesis was to assess how type of CCC in calf rearing systems affects dairy cow and calf welfare in comparison to a rearing system without CCC. To this end, two experiments were conducted. In the first experiment, I assessed the effects of early separation and suckling on the motivation of dairy cows to reunite with their calf. Motivation tests can be used to understand the relative importance of species-specific behaviours to the animal by determining how hard animals are willing to work for a given resource that allows them to express certain behaviours. To further understand the welfare implications of a partial and a full CCC system, I assessed in a second experiment how type of CCC affected calf-directed affiliative behaviour of cows. To this end, calves were either housed in a pen adjacent to the cow pen allowing limited physical contact on initiative of the dam without suckling opportunities (i.e. partial contact) or together with the dams in the cow pen where they could freely suckle the dam (i.e. full contact). Besides, the health status and performance of cow-calf pairs were examined when either no contact (early separation), partial contact, or full contact was allowed. For calves, data were collected regarding their clinical health status, faecal microbiota, haematological profile, immune and hormonal parameters, and growth rates, whereas for dams the clinical health status, metabolic responses, and milk performance was assessed. Additionally, I examined the effect of different two-step debonding strategies on the health, performance, and stress responses of partial contact and full contact cow-calf pairs compared to cow-calf pairs without contact, as one major welfare challenge in prolonged CCC systems is breaking the mother-young bond for weaning and separation (i.e. debonding). Between week 7 to 10, full contact cow-calf pairs were either subjected to reduced contact prior to weaning via fence-line separation or to reduced contact at weaning by inserting a nose-flap in the calf's nose, whereas partial contact cow-calf pairs were either subjected to reduced contact before

or reduced contact after weaning by spatially preventing physical contact. Lastly, a calf escape test was performed at 6-months of age to assess the impact of CCC on the human-animal relationship.

In summary, my dissertation identified trade-offs for animal welfare in both partial and full CCC systems. On the one hand, dairy cows seem to benefit most from full CCC with regard to the possibilities to express species-specific behaviour, as reflected by an enhanced motivation to reunite with their calf and an increased expression of maternal-filial behaviour. Furthermore, cow health was not affected by prolonged CCC, but farmers would face reduced machine-harvested milk yields with a lower fat content in full CCC systems during the suckling period. Although a full CCC system also offers calves opportunities to express their natural behaviour, it seemed to compromise calf health. This was reflected by an impaired calf health status, elevated haematological parameters indicative of infections, and a tendency for higher antibiotic usage in full contact calves compared to calves without contact. Still, full CCC resulted in a greater average daily gain in calves and a different calf faecal microbiota composition in contrast to no or partial CCC during the first 7 weeks of life. Nevertheless, full CCC caused distress in calves during debonding compared to partial or no CCC, especially when using a nose-flap strategy given the nasal abrasions and negatively impacted calf growth after weaning. Full CCC also seemed to increase the risk for a poor human-animal relationship later in life, as reflected by an greater responsiveness to an unfamiliar human at 6-months of age. In contrast, partial CCC limited the expression of species-specific behaviour in cow-calf pairs but seemed to mitigate the drawbacks of full CCC, as partial CCC did not seem to impair calf health, did not induce distress during debonding, and did not increase calves' responsiveness to humans in comparison to no CCC. Therefore, a partial CCC system could be considered a feasible alternative to enhance animal welfare during the rearing period of dairy calves. Strategies that could potentially mitigate the downsides of both CCC systems relate to improved indoor cow-calf housing, enhanced calf feeding and monitoring strategies, and improved new-born management.

Sources

Dissertation – DOI: 10.18174/564225
Paper 1 Motivation test – DOI: 10.1038/s41598-020-70927-w
Paper 2 Affiliative behaviour – DOI: 10.1016/j.applanim.2021.105461
Paper 3 Animal health and performance – DOI: 10.3389/fvets.2022.855086
Paper 4 Debonding strategies – DOI: 10.1016/j.applanim.2022.105694