



Milk allowance and weaning method affect the use of a computer controlled milk feeder and the development of cross-sucking in dairy calves

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Abstract

The effect of milk allowance and type of weaning on behaviour in dairy calves was investigated. A total of 72 calves divided into 6 blocks of 12 calves were used. The calves in each block were divided into two groups and housed in a separate section containing two straw-bedded pens, each with a computer controlled milk feeder. Within block, calves were assigned to either a low milk allowance (4.8 l/day for heavy breeds and 3.6 l/day for Jersey) or a high milk allowance (9.2 l/day for heavy breeds and 7.2 l/day for Jersey), while concentrate was feed ad libitum. One group in each block was assigned to gradual weaning from 6 to 8 weeks of age, while the other was assigned to abrupt weaning at 8 weeks of age. Recordings of cross-sucking were done on days before, during and after weaning, and use of milk and concentrate feeder was recorded throughout the experiment. Abruptly weaned calves performed more cross-sucking than gradually weaned calves immediately after weaning ($P < 0.01$), while this difference was not found 4 days after weaning. Before weaning was initiated, calves on a low milk allowance had more unrewarded visits to the milk feeder than calves on a high milk allowance ($P < 0.01$). During the weaning period, calves on an unchanged milk allowance had a lower number of unrewarded visits ($P < 0.05$) to the milk feeder than gradually weaned calves. However, the first 5 days after weaning, they had longer duration ($P < 0.05$) and a higher number of unrewarded visits ($P < 0.01$) than gradually weaned calves. These results indicate that gradual weaning of calves reduces cross-sucking and unrewarded occupancy of the milk feeder compared to abrupt

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weaning. Furthermore, a high milk allowance reduces unrewarded occupancy during the milk feeding period.

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1. Introduction

During the first 2 weeks after birth, calves are usually housed individually in small pens or hutches and fed milk from either a bucket or a teat bucket twice a day. After this period, it is recommended to house them in groups in order to accommodate their strong social behavioural needs. In dairy production in Europe, an increased use of automatic milk feeders for group housed calves has been seen over the last few decades, and with this development increased knowledge of how these milk feeders affect the calves' behaviour is needed. One concern about group housing calves in the milk feeding period is the risk of cross-sucking, which may have long term effects (Keil and Langhans, 2001). Cross-sucking is defined as sucking of ears, tail, prepuce, udder area and other body parts of another calf (e.g. Haley et al., 1998; de Passillé, 2001; Weber and Wechsler, 2001). Cross-sucking is a redirection of the calf's natural sucking behaviour. When a calf is raised by a cow non-nutritive sucking serve to stimulate milk let down (Jung and Lidfors, 2001). Non-nutritive sucking is the calf's natural response to a decrease in milk flow and the termination of a milk meal (Haley et al., 1998) and also function to stimulate future milk production (Jung, 2001). In motivational studies non-nutritive sucking has been found to be elicited by the taste of milk and to last for up to 10 min after a milk meal (Lidfors, 1993; de Passillé and Rushen, 1997; de Passillé, 2001), and it has been suggested by de Passillé and Rushen (1997) to reflect an inflexible response to the taste of milk. When calves are artificially fed by a milk feeder they have a behavioural need to perform sucking and in order to prevent the calves from redirecting the sucking to other calves (cross-sucking) this need has to be satisfied in other ways, e.g. by increased sucking behaviour in the milk feeder.

The development of cross-sucking is thus related to the ingestion of milk, and calves receiving small milk portions performed more cross-sucking compared to those receiving larger milk portions (Jung and Lidfors, 2001). Thus, if the sucking motivation is stimulated, but small portions are given there may be a higher risk of cross-sucking.

The development of cross-sucking also appears to be related to the energy intake as a low total energy intake increased the risk of cross-sucking in dairy calves (Keil and Langhans, 2001). Therefore, stimulation of concentrate intake during the last part of the milk feeding period may lower the risk of cross-sucking. Calves on a low milk allowance eat more concentrate, but they may not be able to fully compensate for the low milk intake by eating more concentrate due to an undeveloped rumen (Foldager et al., 1986).

Gradual weaning from milk resulted in more cross-sucking (Jung and Lidfors, 2001), and as calves have been found to perform more non-nutritive sucking on low levels of milk (de Passillé and Rushen, 1997) gradual weaning may be hypothesised to cause more cross-sucking. On the other hand, during gradual weaning the concentrate intake is stimulated (Jensen, 2006) and therefore gradual weaning may also be hypothesised to cause less cross-sucking, because calves experience less energy deficit at weaning. Finally, the effects of weaning method may depend on the previous milk allowance.

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