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The effect of flooring type and social grouping on the rest and growth of dairy calves

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Abstract

We studied the effect of softness of flooring and the presence of a companion calf on calves' growth and rest by housing 1-week-old calves for 20 weeks in one of the three housing treatments: housed in pairs ($n = 12$ pairs) in concrete-floor double pens (2.1 m \times 1.8 m) (PAIR), individually housed ($n = 12$) in concrete-floor (CONCRETE) pens (1.05 m \times 1.8 m) and individually housed ($n = 12$) in identical pens, but with soft rubber mats (RUBBER MAT). The calves were filmed continuously for 24-h periods at 2, 4, 6, 7, 11, 14, and 21 weeks of age. Their activity was scored for total daily duration, frequency of bouts and mean duration of bouts of total resting, resting on the side or resting on the sternum. The effect of time of day was examined at 4, 7, 14, and 21 weeks of age. Housing had no effect on the mean daily growth but the mean daily gain was significantly and positively correlated with the total time spent resting over the whole 20-week period. As the calves grew older, the daily time spent resting remained fairly constant, but the proportions of time resting on the side decreased. However, 2-week-old calves were never seen to lie on their sides. The time spent resting around feeding times decreased after solid feeding was introduced. The type of housing had little effect upon resting behaviour. The daily duration and bout frequency of resting on the side were higher for PAIR calves than CONCRETE but no other differences were noted. No differences between CONCRETE and RUBBER MAT calves were seen. Adequate rest appears important for the growth of calves as the longer the calves rested the better they grew. The softness of the floor had little

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effect on the growth or behaviour of the calves although it is possible that the bedding used alleviated the hardness of concrete floor. Pair housed calves were able to use the larger pen area and rested more often and for longer durations on their side than individually housed calves.

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1. Introduction

Adequate rest is essential for the welfare of young growing animals. A positive correlation between the amount of rest and growth rates has been reported for growing cattle (Mogensen et al., 1997). The rhythms of rest and activity of calves have been proposed as potential measures of the extent that farm animals have adapted to their environment (Ruckebush, 1975; Veissier et al., 1989). Young calves rest for much of the day, mainly while lying on the sternum: this occupies approximately 50% of the day during the first 3 months of age. Relatively little time is spent resting while lying on the side; time in this occupies only 1–2% of the day during the first 3 months (Le-Neindre, 1993; Hänninen et al., 2003). The function of different resting postures is not clear. A thermoregulatory function may be involved as lying on the side increases the exposure of the body surface to the atmosphere and may increase heat loss (Redbo et al., 1996; Hänninen et al., 2003). If this is the case, we would expect to see less lying on the side when the animals are more susceptible to cold, for example, at a very young age.

Housing and management conditions can affect rest in young ruminants (de Wilt, 1985; Bøe and Havrevoll, 1993; Sato and Kuroda, 1993; Bokkers and Koene, 2001; Bøe et al., 2003). As bedding material is costly and requires more labour, young calves are usually housed on slatted floors or on concrete solid floors, which may be too hard and cold for calves. Adult dairy cows show a clear preference for soft floors in their stalls (Manninen et al., 2002; Tucker et al., 2003), and cows rest longer, and get up and lie down more frequently on softer floors (Haley et al., 2001). However, it is not known how soft flooring affects the resting behaviour of younger calves. The thermal properties of stall floors may be important for young calves; we reported previously, that the time spent resting on the side by un-weaned calves is shorter on cool or drafty floors (Hänninen et al., 2003). The thermal properties of floors may also affect the postures calves adopt when resting. In cold or cool environments, calves also choose to rest curled up in order to save heat (Redbo et al., 1996; Hänninen et al., 2003). In addition, the available space (Le-Neindre, 1993) and/or degree of softness of the floor may restrict either the amount of time spent resting or the resting postures that are adopted.

Traditionally, veal calves and replacement dairy calves have been housed individually, but concerns about animal welfare have led to increased interest in group housing for calves. Since cattle are a gregarious species, a companion calf may increase calves' welfare in many ways. Group housing can promote growth through an increased feed intake caused by a social facilitation, especially at weaning (Chua et al., 2002). On the other hand, group housing may disturb calves resting behaviour; especially if the space is restricted (Le-Neindre, 1993).

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