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Welfare implications of artificial rearing and early weaning in sheep

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Abstract

Soon after parturition a lasting and mutual ewe–lamb bond is established. However, in an increasing number of intensive sheep farms, lambs are separated from the dam at an early age. When artificial rearing is applied lambs are often kept with mothers for 2 days to allow the ingestion of maternal colostrum and then abruptly removed from their dams. Thus, lambs experience a marked emotional stress represented by the loss of the most relevant social model at this early stage of their behavioural development and a nutritional stress represented by the transition from maternal milk to a commercial milk substitute. These animals when exposed to open field tests show reduced levels of vocalization, are slower to initiate movements, spend less time in ambulatory behaviour and display an increased cortisol response than non-separated animals. In addition, artificial rearing performed on lambs from 2 days of age onward can cause decreased cellular and humoral immune responses. The main oral abnormal behaviour performed by artificially reared lambs is represented by sucking the navel or the scrotum of pen mates. This activity is evident from the initial days on reconstituted milk and lasts until weaning from milk. Attempts have been made to reduce the detrimental effects of early separation. Some of them mainly focus on the emotional aspects (it is recommended not to leave a lamb alone for artificial rearing), others aim at reducing the nutritional impact of artificial rearing (milk intake can be increased by offering a mix of ewe milk and a milk replacer during the first week and then gradually moved to a diet based only on milk substitute which results in higher growth rates). As compared with artificial rearing, early weaning performed at 3 months of age is associated with a later disruption of the mother–young bond and the consequent direct replacement of maternal milk by solid food. However, when they are given the chance, ewes and their lambs form long-term social

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associations which exceed the age of natural weaning, regarded as the end of the milk feeding period. Early weaned lambs emit an increased number of high pitched bleats immediately after weaning than before and this increment is still evident 2 days afterwards. Neither partial nor gradual separation from mothers is able to reduce the stress associated with early weaning. In conclusion, premature separation from mothers has clear and marked detrimental effects on various functions in lambs. For lambs maternal deprivation seems to be worse at 2 days (artificial rearing) than at 3 months of age (early weaning).

Keywords: Lamb; Artificial rearing; Weaning; Animal welfare; Behaviour

1. Introduction

In conventional dairy sheep production systems, lambs are suckled by their dams and either weaned (replacements) or slaughtered at an age of about 45–50 days. However, in an increasing number of specialised milk production farms, lambs are separated from the dam at an earlier age (0–2 days) and fed a milk replacer in order to increase the amount of milk available for cheese making. This technique is referred to as artificial rearing. Artificial rearing is also, albeit less frequently, performed in meat production systems to improve the reproductive performance of ewes, although in these systems weaning more often takes place at 3 months of age (early weaning).

In the present review we describe the formation and resolution of the ewe–lamb bond under natural conditions. Thereafter, we discuss the effects of premature dam–lamb separation, performed through artificial rearing or early weaning on behavioural, endocrine and immune responses of ewe and lamb. The techniques that may be used to mitigate the effects of a premature separation of lambs from mothers are also discussed.

2. Ewe–lamb relationship

2.1. Formation and maintenance of ewe–lamb bond

In mammals, a fundamental function of mothers is nursing their offspring and promoting the development of social behaviour. Soon after parturition a lasting and mutual ewe–lamb bond is established. The onset of this strong relationship is allowed by two main mechanisms: the maternal response of the ewe and the learning ability of the lamb. The maternal response is under hormonal control as demonstrated by the fact that maternal responsiveness of ewes toward newborn lambs follows the changes in blood estrogens with the highest percentage of animals showing maternal behaviour at parturition, when the estrogens concentration is the highest (Poindron and Le Neindre, 1980; Poindron and Lévy, 1990; Dwyer et al., 2004). Hormones also induce a sensitive period in post parturient ewes during which mothers develop selectivity. Further elements facilitating the onset of maternal behaviour in sheep are the vaginal stimulation operated by the foetus at parturition (Keverne et al., 1982) and the presence of amniotic fluid on the newborn lambs (Lévy et al., 1983). A marked responsiveness of ewes to newborn lambs can be observed in the first 4 h after parturition. The response of the ewe to the neonates includes low pitched bleating and vigorous licking which last about an hour and allow the mothers to learn how to distinguish their own lambs from alien lambs, the latter being actively rejected by head butting