

## IMPORTANCE OF MILK INTAKE IN PREVENTING OSTEOPOROSIS IN YOUNG LAMBS AT PASTURE

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Bone disorders such as osteoporosis and femoral fractures in young lambs have been associated with deficiencies of calcium, copper, and vitamin D, intestinal parasitism and general malnutrition. When lambs were fed milk only at restricted intakes to limit growth, energy and protein intake limited bone growth but bone structure was normal (Tulloh et al. 1986). Hodge et al. (1973) fed liquid diets to rapidly-growing lambs, and observed that the cortical thickness of limb bones was related to Ca intake. These studies bear little relationship to the situation on farms where young lambs may rely on pasture to maintain growth when milk supply from the ewe is inadequate. In this experiment we examined the relationship between level of milk and pasture intakes on bone development in lambs to 15 weeks of age.

Thirty single male lambs were removed from their mothers in the first week of life, and adapted to a milk substitute over a seven day period before being randomly allocated to one of 3 groups. The lambs were kept on parasite-free pasture, and each group was fed according to a simulated lactation providing a total of 6.3, 40.3, or 95.9 litres over a 13 week period. Herbage intake was estimated from total faecal collection adjusted for milk intake, and digestibility of oesophageal extrusa. Ca contents of milk, extrusa, and faeces were analysed to determine apparent absorption of Ca shown in the Table.

Weeks	Liveweight gain (g/day)		Milk intake l/day		Herbage intake gDM/day		Total Ca intake g/day		Faecal Ca output g/day		Apparent absorption %	
	0-6	6-12	3	12	3	12	3	12	3	12	3	12
Group 1	117	2	0	0	331	387	1.63	2.19	1.49	1.52	9	31
Group 2	157	24	0.75	0.10	320	394	2.60	2.37	1.61	1.88	38	21
Group 3	208	66	1.50	0.40	279	406	3.44	2.50	1.51	1.85	56	26

One lamb in Group 1 developed a spontaneous fracture of the femur on the final day of week 12 of the experiment when all lambs were autopsied. Cortical bone structure was assessed from mid-shaft sections of the humerus (n=10) and tibia (n=5) of lambs in each group. The percentages of bone within the total cross-sectional area of the mid-shaft of the tibias were 54.1, 62.5, and 69.2 for groups 1, 2, and 3 respectively ( $P < 0.001$ ). Those for the humerus were 50.1, 52.4 and 62.3 respectively ( $P < 0.001$ ). The thickness of the cortex of these two limb bones was related to the milk intake of the lambs ( $r = 0.80$  for the humerus and  $r = 0.83$  for the tibia,  $P < 0.001$ ).

We conclude that an adequate milk and calcium intake during the first 15 weeks of life is essential for growth and prevention of osteoporosis in lambs at pasture.

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TULLOH, N.M., BRIMBLECOMBE, H. and DENNIS, C. (1986). *J. agric. Sci., Camb.* 106: 341.

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