Determination of 25-hydroxy-vitamin D status, serum CrossLaps, and calcium intake in individuals with primary adult-type lactose malabsorption

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Eine Gesundheitseinrichtung der gespag

INTRODUCTION:

Primary adult-type lactose malabsorption (PALM) is a widespread inherited autosomal recessive condition. It is considered to be associated with osteoporosis. The purpose of the present study was to assess the 25-hydroxy-vitamin D (25[OH]D) status, serum CrossLaps and dairy calcium intake in individuals with PALM (i.e., *LCT* C/C_{-13910} genotype) and normal controls (i.e., LCT C/T_{-13910} and T/T_{-13910} genotypes). In addition, the height, weight and body mass index (BMI) were determined.

METHODS:

In total, 210 adult individuals, who were referred to our outpatient clinic for PALM testing, were included in this prospective cross-sectional study. All participants underwent genotyping for the *LCT* C/T_{-13910} polymorphism, 25(OH)D and CrossLaps measurements and clinical examinations. Blood sampling was performed after a 12 h overnight fasting in the morning between 8 a.m. and 10 a.m. A researcher-developed questionnaire was used to estimate daily calcium intake from dairy products.

RESULTS:

Fifty-five individuals with PALM (i.e., *LCT* C/C_{-13910} homozygotes) showed lower 25(OH)D (mean: 24.95 10.04 vs. 28.59 9.56 ng/mL, P = 0.018) (Figure 1) and higher CrossLaps serum levels (mean: 0.46 0.31 vs. 0.43 0.49 ng/mL, P = 0.251) (Figure 2) compared to 155 normal controls (i.e., *LCT* C/T_{-13910} hetero- or T/T_{-13910} homozygotes). Moreover, 26/55 (47.27%) *LCT* C/C_{-13910} homozygotes reported to be lactose intolerant compared to 31/155 (20.0%) normal controls (P < 0.001). Total dairy calcium intake (mean: 303 162 vs. 330 194 mg per day, P = 0.463) and anthropometric data were similar between PALM probands and controls (Table 2).

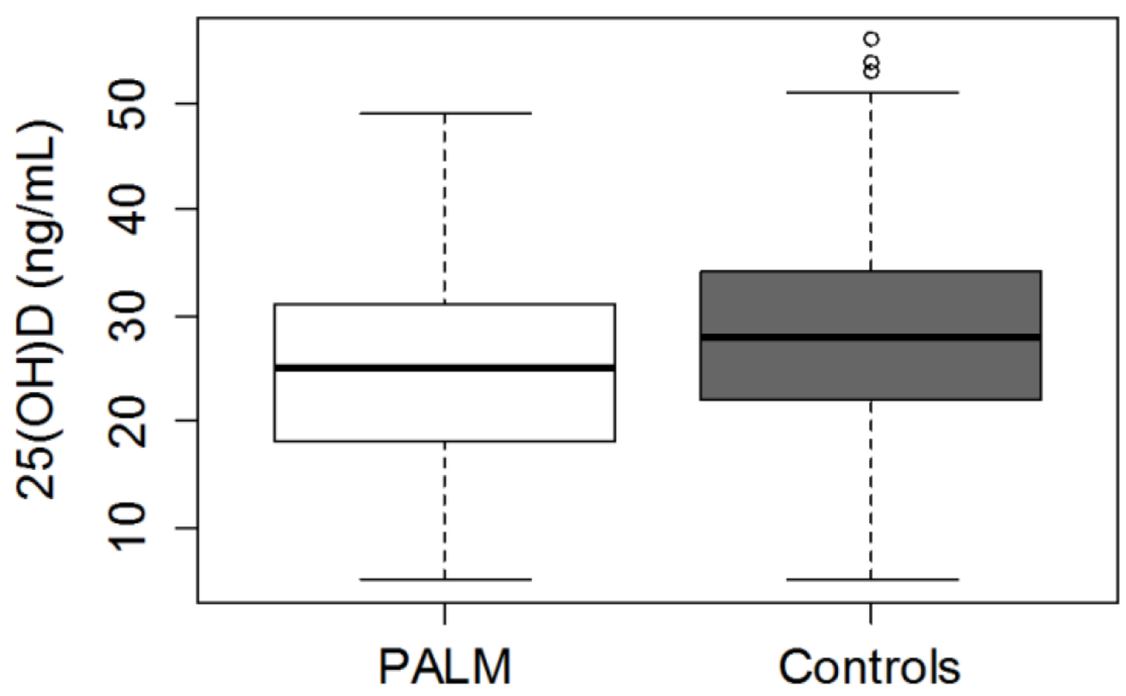

FIGURE 1. Box-and-whisker plot of 25(OH)D serum level comparisons between 55 subjects with primary adult-type lactose malabsorption (PALM) and 155 individuals with lactase-persistence (P < 0.018). The central boxes represent the 25th to 75th percentile range. The lines inside the boxes show the median value for each group.

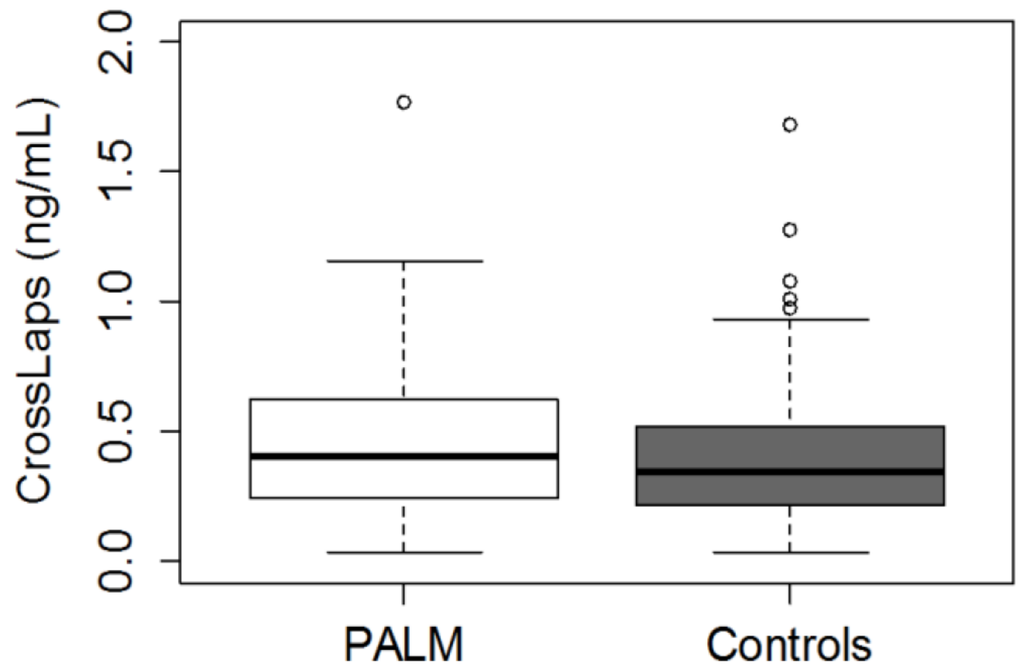

FIGURE 2. Box-and-whisker plot of CrossLaps serum level comparisons between 55 subjects with primary adult-type lactose malabsorption (PALM) and 155 individuals with lactase-persistence (P = 0.251). The central boxes represent the 25th to 75th percentile range. The lines inside the boxes show the median value for each group.

TABLE 1. Anthropometric, biochemical, and nutritional data for 55 individuals with primary adult-type lactose malabsorption (i.e., *LCT* C/C_{-13910} genotype) and 155 individuals with lactase-persistence (i.e., *LCT* C/T_{-13910} and T/T_{-13910} genotypes).

	C/C_{-13910}	C/T_{-13910} and T/T_{-13910}	P-value
Anthropometric data:			
Height (cm)	168 8.7	169 8.6	0.315
Weight (kg)	69.9 15.6	72.3 15.4	0.352
BMI (kg/m²)	24.5 4.7	25.1 4.8	0.466
Biochemical data, ng/mL:			
25(OH)D	24.95 10.04	28.59 9.56	0.018
CrossLaps	0.46 0.31	0.43 0.49	0.251
Calcium intake per day, mg/d:			
Milk	90 91	114 103	0.242
Yoghurt	42 44	57 61	0.272
Quark	28 28	20 21	0.125
Cheese	143 97	139 95	0.819
Total calcium intake	303 162	330 194	0.463
Dietary habits, smoking, family anamnesis, n(%):			
Vegetarian	none	7 (4.52)	0.194
Lactose-free milk consumption	26 (47.27)	31 (20.0)	0.181
Smoker	20 (36.36)	30 (19.35)	0.016
Familial osteoporosis	11 (20.0)	27 (17.42)	0.686

Data are mean standard deviation (SD), or numbers (%); BMI, body mass index; mg/d, milligrams per day.

CONCLUSION:

In conclusion, individuals with PALM were found to have lower 25(OH)D and higher CrossLaps serum levels compared to individuals with lactase-persistence. Based on these findings, we suggest to perform routine 25(OH)D and CrossLaps serum measurements in individuals with PALM. The determination of these biomarkers may contribute to the preservation of life-long bone health.

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