CONTRIBUTION OF DIETARY CAROTENOID INTAKE TO BONE MINERAL STATUS IN ANGLO-CELTIC AUSTRALIANS

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Vitamin A has been reported to be related to bone mass in population-based studies (Yano et al. 1985). Associations between a high intake of retinol and bone mineralisation have been demonstrated in animal studies (Dorr and Balloun 1976; Dhem et al. 1984). However, relationships between carotenoids, as provitamin A, and bone mass have not been reported. the present study, the contribution of dietary intake of carotenoids and preformed retinol to bone mineral status was investigated in a representative Australian population of AngloCeltic ancestry. The study population consisted of 68 men (27-78 years) and 137 women (26-86 years). Bone mineral content (BMC) and bone mineral density (BMD) of total body and lumbar spine (L2-L4) were assessed using dual energy X-ray absorptiometry (DEXA). Daily intake of dietary retinol and individual carotenoids, namely lutein/zeaxanthin, β-cryptoxanthin, lycopene, αcarotene and β-carotene, as well as other nutrients, were estimated using a semi-quantitative food frequency questionnaire.

It was found that, after adjustment for age, body mass index, cigarette smoking, alcohol consumption and other nutrient intake, the dietary intake of certain carotenoids was potentially favourable to bone mineral status in men and premenopausal women. In men, lycopene intake accounted for 10% of the variation of total body BMC and 8% in total body BMD. In premenopausal women, the variance in total body BMD (12%) and lumbar spine BMD (8%) was explained by lutein/zeaxanthin intake alone. In contrast, α-carotene was found to have a potentially adverse effect on total body bone mineral status. Its contributions to the variance in BMC and BMD were 10% and 7%, respectively. In postmenopausal women, none of the dietary carotenoids was found to be significantly related to total body BMC or BMD. Dietary β-carotene intake was potentially favourable for bone mineral status of the lumbar spine. No relationships between bone mineral status and preformed retinol were observed.

It is evident from the present study that dietary carotenoid intake may contribute to bone mineral status of total body and lumbar spine. The antioxidant property of carotenoids may in part explain the contribution of dietary carotenoid intake to bone mineral status. Further studies of carotenoid status and bone metabolic activity are needed to develop the findings of the present study.

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