ICCN Poster Presentations

Evidence based nutrition

Physical activity and calcium consumption are important determinants of lower limb bone mass in elderly women

A Devine*[1,2,3], SS Dhaliwal[3,4], IM Dick[1,2,3], J Bollerslev[1,5], RL Prince[1,2,3]
[1]*School of Medicine and Pharmacology, UWA;* [2]*Dept Endocrinology and Diabetes, Sir Charles Gairdner Hospital;*
[3]*Western Australian Institute of Medical Research*
[4]*Curtin University of Technology, School of Public Health*
[5]*Section of Endocrinology, National University Hospital, Oslo, Norway*

Although there is general agreement that increased dietary calcium consumption and exercise can slow bone loss in elderly women the amount required to have this effect in an elderly population remains uncertain. This study was devised to examine the effects of calcium consumption (CC) and physical activity (PA) on bone mass in an elderly female population. Using a cross sectional study design a population-based sample of elderly women mean age 75±3y had measurements of hip and heel bone mass measured using DXA (Hologic 4500A) (n=1076) and quantitative ultrasound (QUS, Lunar Achilles) (n=1363) respectively. Calcium consumption and physical activity were measured by a validated habitual food frequency and activity questionnaire respectively. Dose response effects of PA and CC on bone mass were examined using ANOVA. Division of the PA and CC into textiles best described the dose response effects. High PA compared to medium or low PA was associated with increased hip BMD and heel QUS (total hip BMD 3.4%; QUS Stiffness 2.7%). High or medium CC compared to low CC was associated with an increased total hip and trochanter BMD of 2.9% and 2.2% respectively with no effect at the QUS heel site. PA and CC were dichotomized at these cut points and the effects on BMD examined. The combination of high PA and CC, achieved by 24% of the population, was associated with a total hipbone density 5.7% higher (36 % of 1SD) than those individuals in the other three groups. Stiffness was 2.7% (17 % of 1 SD) higher in the high PA and CC group than in the low PA and CC groups. Lifestyle factors play an important role in maintenance of lower extremity bone mass. If the whole population undertook and achieved a high physical activity calcium consumption lifestyle the population risk of hip fractures may be expected to be reduced by about 17% in this age group.

Calculation of vitamin A activity from provitamin A carotenoids: what factor should we use?

D Mackerras*
Menzies School of Health Research, Darwin, NT, Australia

When converting the quantity of provitamin A carotenoids to retinol equivalents, it has been standard practice to divide the quantity of beta-carotene by 6 and the quantity of other provitamin A carotenoids by 12. The recent revisions to the US dietary reference intakes propose reducing these conversion factors to 12 and 24 respectively. This recommendation was influenced by two considerations. Firstly, a careful Dutch study that found that the relative absorption of beta-carotene from a mixed vegetable diet was only 14% of beta carotene in oil. Secondly, the view that fruit, which has higher bioavailability, made only a small contribution to provitamin A intake in the US. The variability of bioconversion of provitamin A carotenoids between foods has long been recognised. It has been studied from two difference angles. The absorption of beta-carotene from green vegetables, including leaves, and carrots have been studied in developed countries. Generally low absorption is found, although it is better from cooked carrots than spinach. Many, but not all, randomised controlled trials in less developed counties find that papaya, mango, sweet potato, pumpkin and sometimes carrots are effective in raising scrum retinol levels in populations with low baseline levels. In some studies, some foods have been as effective as capsules of retinol. The results with green leaves are variable. How should these finding be used to decide on a conversion factor? In Australia, pumpkins, fruit and dairy products provide nearly 25% of the provitamin A in the diet. By contrast, leaves and stalks contribute 2% and peas and beans another 2.2%. Carrots and other roots (eg. Sweet potato) contribute 44.4%. In the Dutch study mentioned above, the diet tested contained green beans, broccoli, spinach, green peas, Brussels sprouts, vegetable mix and vegetable-based salads and soups; 43% of beta-carotene was derived from green leaves. Using the results of this trial and following the US proposal of setting a 12:1 conversion factor would probably underestimate the average bioavailability of beta-carotene in Australia. These considerations suggest that it may no longer be appropriate to set a single conversion factor to calculate vitamin A intake for use in all countries.