

Abstract

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Vitamin D intake to attain a desired serum 25-hydroxyvitamin D concentration.

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BACKGROUND: Indirect evidence suggests that optimal vitamin D status is achieved with a serum 25-hydroxyvitamin D [25(OH)D] concentration >75 nmol/L.

OBJECTIVE: We aimed to determine the intake of vitamin D(3) needed to raise serum 25(OH)D to >75 nmol/L.

DESIGN: The design was a 6-mo, prospective, randomized, double-blinded, double-dummy, placebo-controlled study of vitamin D(3) supplementation. Serum 25(OH)D was measured by radioimmunoassay. Vitamin D(3) intake was adjusted every 2 mo by use of an algorithm based on serum 25(OH)D concentration.

RESULTS: A total of 138 subjects entered the study. After 2 dose adjustments, almost all active subjects attained concentrations of 25(OH)D >75 nmol/L, and no subjects exceeded 220 nmol/L. The mean (+/-SD) slope at 9 wk [defined as 25(OH)D change/baseline dose] was 0.66 +/- 0.35 (nmol/L)/(microg/d) and did not differ statistically between blacks and whites. The mean daily dose was 86 microg (3440 IU). The use of computer simulations to obtain the most participants within the range of 75-220 nmol/L predicted an optimal daily dose of 115 microg/d (4600 IU). No hypercalcemia or hypercalciuria was observed.

CONCLUSIONS: Determination of the intake required to attain serum 25(OH)D concentrations >75 nmol/L must consider the wide variability in the dose-response curve and basal 25(OH)D concentrations. Projection of the dose-response curves observed in this convenience sample onto the population of the third National Health and Nutrition Examination Survey suggests a dose of 95 microg/d (3800 IU) for those above a 25(OH)D threshold of 55 nmol/L and a dose of 125 microg/d (5000 IU) for those below that threshold.

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