January 2000. Serum concentrations of 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D were measured in 3,299 and 3,315 participants, respectively, in order to assess vitamin D status. During a median follow-up of 7.7 years, 188 patient deaths were attributed to SCD and 116 patients died due to heart failure. Compared with patients with optimal vitamin D levels, those in the lowest quartile were at increased risk for deaths due to SCD or heart failure. Levels of 25-hydroxyvitamin D and 1,25-dihydroxyvitamin D were negatively correlated with those of N-terminal pro-B-type natriuretic peptide (a marker of ventricular dysfunction and cardiovascular risk) and inversely associated with impaired left ventricular function and higher New York Heart Association classes of heart failure.

The findings indicate an association between low levels of vitamin D metabolites and deaths due to heart failure and SCD. The authors, therefore, recommend further studies to investigate whether vitamin D supplementation can be used to treat or prevent heart disease.

**Original article** Pilz S *et al.* (2008) Association of vitamin D deficiency with heart failure and sudden cardiac death in a large cross-sectional study of patients referred for coronary angiography. *J Clin Endocrinol Metab* **93:** 3927–3935

## Severe periodontitis is associated with the metabolic syndrome

Periodontitis has been associated with several components of the metabolic syndrome, such as systemic inflammation, increased insulin resistance and an increased risk of type 2 diabetes, and an almost 20% increased risk of cardiovascular disease. Little information is available, however, on the possible link between the metabolic syndrome and periodontitis. To investigate the possible association, D'Aiuto and colleagues analyzed a cross-sectional survey of noninstitutionalized individuals.

The researchers examined data derived from the Third National Health and Nutrition Examination Survey (NHANES III) on 13,710 individuals aged ≥17 years who had undergone periodontal assessment. Binary (diagnosis) and continuous (clinical extent) measures of periodontitis were considered in relation to the metabolic syndrome and its individual component conditions (central obesity, insulin resistance, elevated triglycerides, low HDL-cholesterol, and hypertension). Prevalence of the metabolic syndrome increased in a linear fashion according to the severity of periodontitis: 18%, 34% and 37% for no or mild periodontitis, moderate periodontitis and severe periodontitis, respectively. Further analysis and adjustment for confounding factors revealed that in never smokers aged over 45 years, those with severe periodontitis were 2.31 times more likely to have the metabolic syndrome than individuals with mild or no periodontitis.

D'Aiuto *et al.* suggest that their findings might explain previous reports of a link between periodontitis and an increased risk of vascular disease and diabetes mellitus later in life. The authors recommend further studies powered to investigate whether improvements in oral health can reduce the risk of the metabolic syndrome and associated traits.

**Original article** D'Aiuto F *et al.* (2008) Association of the metabolic syndrome with severe periodontitis in a large U.S. population-based survey. *J Clin Endocrinol Metab* **93:** 3989–3994

## Vitamin K supplementation improves insulin sensitivity in elderly men

Increased dietary or supplemental vitamin K intake might have a beneficial effect on insulin resistance, but evidence in humans is limited. To address this issue, Yoshida *et al.* conducted a randomized, double-blind, controlled trial to assess the effect of 36 months of vitamin K supplementation on insulin resistance and fasting plasma insulin and glucose concentrations.

This study was ancillary to a trial that investigated the effect of phylloquinone (vitamin $K_1$) supplementation on bone loss in elderly individuals. Nondiabetic participants (aged 60–80 years) were randomly allocated to receive a daily multivitamin supplement that contained 500 μg of phylloquinone (80 men and 104 women) or the same supplement without phylloquinone (62 men and 109 women) for 36 months. Insulin resistance was defined according to homeostasis model assessment of insulin resistance (HOMA-IR) criteria.

HOMA-IR and fasting plasma insulin concentrations were significantly lower in men in the vitamin K group than those in the control group, after adjustment for baseline HOMA-IR, BMI and