

Oral Abstract

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Serum levels of vitamin D, winter sun exposure, knee radiographic osteoarthritis, and knee cartilage loss in older adults: the Tasmania Older Adults Cohort (TASOAC) study

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Objective: To determine the associations between serum levels of vitamin D, winter sun exposure, radiographic osteoarthritis (OA), and knee cartilage loss cross-sectionally and longitudinally in older adults.

Methods: T1-weighted fat-suppressed MRI on right knee was performed in randomly selected subjects at baseline (n=978, mean 62 years, range 51-81, and 50% female) and 2.9 years later (n=419). Knee medial and lateral tibial cartilage volume were measured. Serum 25-hydroxyvitamin D [25 OHD] was assessed by radioimmunoassay and radiographic OA was assessed using the OARSI atlas.

Results: The mean 25OHD level in this sample, which is significantly associated with winter sun exposure, was 52.6 nmol/L at baseline (range 13 to 119 nmol/L). The mean change per annum was +0.85 nmol/L (range -26 to +27 nmol/L). At baseline, in multivariable analysis, serum 25 OHD was significantly associated with knee cartilage volume at medial and lateral tibial sites (β per unit: +2.1 and +2.3 mm³, respectively; all P<0.05), so was winter sun exposure (β per grade: +28 and +54 mm³, respectively; all P<0.05). Vitamin D deficiency (defined as vitamin D of < 50 nmol/L, 45% prevalence) was associated with moderate to severe joint space narrowing in the medial tibiofemoral compartment at both knees, and negatively with knee cartilage volume at both medial and lateral tibial sites (deficiency vs no deficiency: -155 and -88 mm³, respectively; all P<0.05). Longitudinally, vitamin D deficiency predicted loss of medial tibial but not lateral tibial cartilage volume over 2.9 years, whereas vitamin D levels as a continuous variable were significantly associated with change in both medial and lateral tibial cartilage volume (β per unit: +0.05% and +0.04% per annum, respectively; all P<0.05). Changes in vitamin D levels were also positively associated with change in medial tibial cartilage volume.

Conclusions: This study demonstrates significant associations between serum levels of vitamin D obtained mainly from sun exposure, radiographic OA, and increases in knee cartilage volume which are best observed using the whole range of vitamin D rather than predefined cut-points. This implies that vitamin D supplementation may prevent and/or retard cartilage loss in knee osteoarthritis.