

USANA Technical Bulletin

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Osteoarthritis

Description

- Osteoarthritis is a chronic disease involving the joints, especially those bearing weight. It is characterized by degeneration of articular cartilage, overgrowth of bone with lipping and spur formation, and impaired function.¹

Causes

- There are two types of osteoarthritis: primary and secondary. While the difference is not always clinically obvious, cases are divided by the cause.
- Primary osteoarthritis has no known cause, but is usually related to aging.
- Secondary osteoarthritis results from obesity, repeated trauma, congenital abnormalities, gout, diabetes, hormone disorders, and other identifiable causes.

At Risk

- Those generally at risk are the elderly and people experiencing any of the problems that can cause the secondary type.

Prevention and Management

- Swimming is often recommended because it is very good exercise and does not stress the joints.
- Because the correlation between obesity and osteoarthritis is so strong, weight control is paramount. This correlation applies not only to the hip and knee but also to the prevalence of osteoarthritis in the hands. Preliminary studies suggest that weight loss can both prevent the onset of symptomatic disease and alleviate symptoms when present.²
- Low intakes and serum levels of vitamin D each appear to be associated with an increased risk for progression of osteoarthritis in the knee.³
- People with arthritis have lower boron concentrations in their bones and synovial fluid than other people. In a double-blind placebo-boron supplementation trial, 20 subjects with osteoarthritis were given supplemental boron. A significant favorable response to a 6 mg boron/day supplement was observed.⁴
- There is observational evidence that bones of patients using boron supplements are much harder to cut than those of patients not using supplements. In areas of the world where boron intakes are 1.0 mg or less/day the estimated incidence of arthritis ranges

from 20-70%, whereas in areas of the world where boron intakes are higher, 3 to 10 mg, the estimated incidence of arthritis ranges from 0 to 10%.

- Research indicates that proanthocyanidins disrupt the action of collagenase (an enzyme with breaks down cartilage) by attaching (+) catechins to the cartilage. This attachment modifies the structure of collagen enough to make it resistant to enzymatic degradation.⁵
- Niacinamide (vitamin B3) may help by enhancing glucocorticoid secretion.⁶
- Vitamin C has been reported to reduce cartilage loss.⁷
- Vitamin E may help reduce pain associated with osteoarthritis.⁸

Abstracts

Flynn MA, Irvin W, Krause G. *The effect of folate and cobalamin on osteoarthritic hands. J Am Coll Nutr 1994 Aug;13(4):351-6.* OBJECTIVE: Historically diet and arthritis have been cause/effect associated but the idea is controversial with little evidence that specific diet components are effective treatment. This controlled, double-blinded, crossover study reports the effect of folate and cobalamin supplements in 26 humans diagnosed for an average 5.7 years with idiopathic osteoarthritis of the hands who had been medicated by prescribed nonsteroidal anti-inflammatory drugs (NSAID). METHODS: Subjects entered the study after a 10-day washout period from use of all anti-arthritis drugs, vitamins, and minerals. They were randomly allocated to consume daily 6400 micrograms folate or 6400 micrograms folate plus 20 micrograms cobalamin or lactose placebo each for 2 months within self-selected diets. Pain was to be medicated by acetaminophen as needed, and at the end of each phase they returned for assessment and dispensing of the next treatment. Serum folate and cobalamin, red blood cell folate, blood smears, diet records, standard rheumatology assessment and hand grip measurements were reviewed and statistically analyzed. RESULTS: For all subjects mean right and left hand grip values were higher with combined cobalamin-folate ingestion than with other "vitamin" supplements and were equivalent to NSAID use. Number of tender hand joints were greater with use of NSAID than with use of cobalamin-folate. Side effects with the vitamin combination were none; side effects of NSAID are many, and the cost of vitamins and acetaminophen also is lower. CONCLUSION: The limited number of subjects in this study demonstrates that ingestion of a prescribed cobalamin-folate supplement and acetaminophen as needed resulted in positive outcomes.

McAlindon TE, Jacques P, Zhang Y, Hannan MT, Aliabadi P, Weissman B, Rush D, Levy D, Felson DT. *Antioxidant micronutrients protect against the development and progression of knee osteoarthritis. Arthritis Rheum 1996 Apr;39(4):648-56.*

OBJECTIVE: Cumulative damage to tissues, mediated by reactive oxygen species, has been implicated as a pathway that leads to many of the degenerative changes associated with aging. We hypothesized that increased intake of antioxidant micronutrients might be associated with decreased rates of osteoarthritis (OA) in the knees, a common age-related disorder. METHODS: Participants in the Framingham Osteoarthritis Cohort Study underwent knee evaluations by radiography at examinations 18 (1983-1985) and 22 (1992-1993). Usual dietary intake was assessed using the Food Frequency Questionnaire, administered at examination 20 (1988-1989). Knees without OA at baseline (Kellgren and Lawrence [K&L] grade ≤ 1) were classified as having incident OA if they had a K&L grade ≥ 2 at followup. Knees with OA at baseline were classified as having progressive OA if their score increased by ≥ 1 at followup. Knees were also classified as having cartilage loss or osteophyte growth if their maximal joint space narrowing or osteophyte growth score increased by ≥ 1 (range 0-3). The association of vitamin C, beta carotene, and vitamin E intake, ranked in sex-specific tertiles, with incidence and progression of OA was compared with that of a panel of nonantioxidant vitamins, B1, B6, niacin, and folate, using logistic regression and generalized estimation equations to adjust for correlation between fellow knees. The lowest tertile for each dietary exposure was used as the referent category. Odds ratios (OR) were adjusted for age, sex, body mass index, weight change, knee injury,

physical activity, energy intake, and health status. RESULTS: Six hundred forty participants received complete assessments. Incident and progressive OA occurred in 81 and 68 knees, respectively. We found no significant association of incident OA with any nutrient. A 3-fold reduction in risk of OA progression was found for both the middle tertile (adjusted OR = 0.3, 95% confidence interval [95% CI] 0.1-0.8) and highest tertile (adjusted OR = 0.3, 95% CI 0.1-0.6) of vitamin C intake. This related predominantly to a reduced risk of cartilage loss (adjusted OR = 0.3, 95% CI 0.1-0.8). Those with high vitamin C intake also had a reduced risk of developing knee pain (adjusted OR = 0.3, 95% CI 0.1-0.8). A reduction in risk of OA progression was seen for beta carotene (adjusted OR = 0.4, 95% CI 0.2-0.9) and vitamin E intake (adjusted OR = 0.7, 95% CI 0.3-1.6), but was less consistent. No significant associations were observed for the nonantioxidant nutrients. CONCLUSION: High intake of antioxidant micronutrients, especially vitamin C, may reduce the risk of cartilage loss and disease progression in people with OA. We found no effect of antioxidant nutrients on incident OA. These preliminary findings warrant confirmation.

References

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