



## Arthritis News

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### **IMPROVED VITAMIN D LEVELS MAY DECREASE KNEE DISABILITY IN OSTEOARTHRITIS PATIENTS**

SAN ANTONIO, TEXAS—Increased vitamin D levels appear to improve muscle strength and physical function for vitamin D-deficient patients with knee osteoarthritis, according to research presented this week at the American College of Rheumatology Annual Scientific Meeting in San Antonio, Texas.

While previous studies have associated vitamin D deficiencies with an increased risk for severity of knee osteoarthritis, **this is the first look at vitamin levels in relation to pain and disability.** The 221 patients, average age 67 years, participating in this study were measured for changes in pain, physical function, muscle strength and serum levels of vitamin D (measurable amounts of vitamin D in the blood) two or more times across a 15- and 30-month period. **At the outset, the 48 percent of patients with low levels of vitamin D (at or below the minimal 20 ng/ml needed to satisfy the body's requirements) experienced more pain and disability than those with levels above 20 ng/ml. Those with deficient serum vitamin D were also weaker,** but this was not significant.

The study also found that changes in vitamin D status over time predicted changes in disability. Those with sufficient serum vitamin D that became deficient over time experienced worsening disability scores, while those with deficient serum vitamin D that became sufficient over time improved their disability scores. Change in serum vitamin D levels also showed a similar pattern in changes in pain but this was not significant.

Vitamin D, which comes primarily from exposure to sunlight, promotes the absorption of calcium and phosphorus in bone mineralization, growth and repair. Sources of vitamin D are available to a lesser extent from dietary sources typically found in fortified margarine, oily fish, liver, fortified breakfast cereals and dairy products. However, the elderly are less efficient at producing vitamin D from sunlight and absorbing it from food. To address their higher risk for D deficiency, the elderly population is often directed to take a vitamin D supplement of 400–600 IU per day (exposure to sun should be limited to five to 15 minutes on the face, hands or arms, or arms and legs).

“Data suggests that many people may be vitamin D deficient, especially those living in the northern hemisphere and darker skinned individuals,” said Kristin Baker, PhD, Clinical Epidemiology and Research Training Unit, Boston University Boston, Massachusetts, and an investigator in the study. **“The good news is vitamin D levels are easily modifiable through safe, short-term exposure to sun and/or dietary intake, and may lessen the disability and pain of osteoarthritis.”**

The American College of Rheumatology is the professional organization for rheumatologists and health professionals who share a dedication to healing, preventing disability and curing arthritis and related rheumatic and musculoskeletal diseases. For more information on the ACR's annual meeting, see [www.rheumatology.org/annual](http://www.rheumatology.org/annual).

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*Editor's Notes: Dr. Baker will present this research during a scientific session at the ACR Annual Scientific Meeting from 2:30–2:45 PM CT (3:30–3:45 PM ET) on Wednesday, October 20, in the Theatre of the Henry B. González Convention Center. She will be available for media questions during a briefing at 8:30 AM CT (9:30 AM ET) on Monday, October 18, in the on-site Press Conference Room, Room 218.*

## Hypovitaminosis D and its Association with Muscle Strength, Pain and Physical Function in Knee Osteoarthritis (OA): A 30-month Longitudinal, Observational Study

K. Baker, YQ Zhang, J. Goggins, M. Clancy, M. LaValley, JB Niu, D. Felson. Boston University, Boston, MA

While low serum levels of vitamin D (Vit D) have been associated with an increased risk for progression of knee OA, the relationship to pain and disability in knee OA has not been investigated. In cross sectional studies Vit D has been associated with muscle weakness and disability. Also, recently, pain in persons with cancer was found associated with hypovitaminosis D, leading to the hypothesis that low Vit D levels contribute to worse pain in many disorders. The purpose of this study was to evaluate the relationship of Vit D to pain, physical function, and muscle strength in subjects with symptomatic knee OA.

Subjects were recruited from the Boston VA Medical Center and surrounding community. Eligibility criteria included evidence of knee OA by radiograph and pain in the knee on most days of the previous month. Measurements at baseline, 15, and 30-months included WOMAC pain subscale (Likert scale, 0–20), WOMAC physical function scale (0–68), serum levels of Vit D, and isokinetic strength of concentric knee extension (at 600/sec; 3 repetitions with the maximal strength used). We looked at the association of baseline serum Vit D with baseline pain, physical function and muscle strength, and change in serum Vit D and change in pain, physical function and muscle strength. For the analysis of baseline Vit D with baseline WOMAC pain and physical function and baseline muscle strength, serum Vit D was dichotomized into those deficient (< 20 ng/ml) and those not deficient (> 20 ng/ml, minimal amount to satisfy the body's requirement for Vit D). Outcomes were analyzed using regression or repeated measures regression analyses adjusted for sex.

221 subjects (63% male, mean age 67 + 10, mean BMI 31 + 6) had both serum Vit D and WOMAC at 2 or more time points. 48% of subjects had Vit D levels below 20 ng/ml. Low baseline Vit D was associated with more pain and disability. Those with low baseline vitamin D were weaker but this association was not significant. For the change analysis, we saw an association between positive and negative changes in vitamin D and disability but not for pain and muscle strength. Those that became deficient had more pain and were weaker (with the exception of weakness in women) but again this trend was not significant (see table for baseline and change data).

In summary, we found that persons with low Vit D levels (< 20 ng/ml) had more knee pain and disability compared to those who were not Vit D deficient. An increase in serum vitamin D over 30 months correlated with an improvement in WOMAC disability.

**Association of Vitamin D with Pain, Physical Function and Strength—LS means (SE)**

	Baseline Vit D deficient - $\leq$ 20 ng/ml (14 $\pm$ 4 ng/ml)	Baseline Vit D sufficient- > 20 ng/ml (27 $\pm$ 6 ng/ml)	p value	Vit D over 30 months (no change)	Vit D over 30 months (sufficient to deficient)	Vit D over 30 months (deficient to sufficient)	p value
WOMAC pain (0–20)	8.0 (0.4)	6.6 (0.4)	<0.0001	7.1 (0.2)	8.1 (0.8)	6.6 (0.5)	0.12
WOMAC disability (0–68)	26.9 (1.2)	21.7 (1.3)	<0.0001	23.8 (0.7)	27.3 (2.3)	21.8 (1.6)	0.05
Strength (newtons) by sex	M: 75.8 (4.5) F: 50.5 (3.3)	M: 78.2 (4.5) F: 56.2 (3.6)	M: 0.6 F: 0.1	M: 77.9 (2.6) F: 49.8 (1.9)	M: 69.5 (6.9) F: 56.1 (6.0)	M: 83.6 (7.7) F: 54.1 (4.7)	M: 0.5 F: 0.3

**Disclosure:** K. Baker, None; Y. Zhang, None; J. Goggins, None; M. Clancy, None; M. LaValley, None; J. Niu, None; D. Felson, None.