It's Not Just About Calcium! Vitamins K2 & D3: Key Players in Bone & Cardiovascular Health

Vitamin D is a heavyweight in the natural products industry, thanks to volumes of beneficial, easy-to-understand research, which has translated into big sales. What manufacturers and consumers don't realize is that there is another nutrient whose benefits rival—as well as complement—those attributed to vitamin D.

That nutrient is vitamin K, specifically vitamin K2, which has displayed a synergy with vitamin D3 regarding cardiovascular health and bone health – two worldwide threats to anyone with a pulse. Before looking at what they can do together, let's review the individual strengths of vitamin D and vitamin K2.

Vitamin K2: Keeping Calcium Where It's Needed

Osteocalcin influences bone mineralization, in part through its ability to bind to the mineral component of bone, hydroxyapatite[2], which in turn makes the skeleton stronger and less susceptible to fracture.

That asset alone would make vitamin K2 a major player in the bone health category. But then one needs to consider that while vitamin K2 helps put calcium into bones, it also helps keep it out of the heart's arterial vessels, which leads to arterial hardening, or calcification, increasing the risk of cardiovascular disease. The vitamin K-dependent protein Matrix-Gla Protein (MGP) regulates this potentially fatal calcium accumulation.[4] So, not only does vitamin K2 help with bone health, it plays a major role in managing cardiovascular health—something millions struggle with on a daily basis.

Vitamin D: For Bone Health & Beyond

Vitamin D's major function is to help the body better absorb calcium. This helps build bone at a younger age.

"The consequences of vitamin D deficiency are disturbance of calcium metabolism and bone loss, leading to fractures, mineralization defects, which may lead to softening of the bone in the long term, and muscle weakness, causing falls and fractures," said researchers from the Netherlands' VU University Medical Center in its 2011 study, "The Effect of Vitamin D on Bone and Osteoporosis."[5] "Vitamin D status is related to bone mineral density and bone turnover. Vitamin D supplementation may decrease bone turnover and increase bone mineral density."

One could (and a few have) write a large book onthe benefits of vitamin D. Several recent epidemiological studies have demonstrated a strong association between vitamin D insufficiency

and risk of metabolic problems. A study in the Netherlands provides compelling evidence that a high vitamin D status is associated with improved survival in heart failure patients. And evidence shows that vitamin D deficiency is related to cardiovascular health – this is an especially noteworthy development because cardiovascular diseases is the world's leading cause of death among men and women.[6]

What's unfortunate is that even though vitamin D is available through the simple source of sunshine, a billion people worldwide are deficient in vitamin D.[7]

The Gatekeeper & The Traffic Cop

Taking just vitamin D may not be enough. Consider that very high doses once per year may have adverse effects. Also, while vitamin D may absorb calcium, it cannot steer it away from the arteries.

To do that, it requires the presence of vitamin K2, which can activate newly formed osteocalcin.

Think of vitamin D as "the gatekeeper" – it controls who gets in. Meanwhile, vitamin K2 is the "traffic cop" – it directs the traffic (in this case, calcium) where to go. Lots of traffic, but no traffic cop means clogging, crowding, and widespread chaos. Without the presence of vitamin K2, the calcium that vitamin D so effectively lets in might work against us, depositing calcium in the coronary arteries instead of the bones.

In the fight against inflammation, the culprit behind so many other health problems, vitamin K2 and vitamin D are powerful allies.[8] When the body's soft tissues are damaged, they respond with an inflammatory process that can result in the calcium getting stored in the compromised tissue. When this occurs in our blood vessels, one has the buildup of harmful plaque, which can lead us down the all-too-familiar path to heart problems. Vitamins K2 and D increase MGP, the aforementioned protein responsible for protecting your blood vessels from calcification.[9] In healthy arteries, MGP congregates around the elastic fibers of your tunica media (arterial lining), guarding them against calcium crystal formation.

How important is MGP? It can be used as a laboratory measure of one's vascular and cardiac status.

Studies support the effectiveness of its collaboration. A study from Keio University revealed that vitamins K2 and D3 (or cholecalciferol) "may be effective for mild postmenopausal osteoporosis." In a 2010 article for *The Alternative Medicine Review* examining vitamins K and D, Dr. Parris M. Kidd verified their roles in bone health, cardiovascular health, and inflammation. He wrote that both "can mutually enhance each other's metabolism, a biochemical reciprocity consistent with clinical synergy."[10]

"The wide-ranging, pleiotropic involvements of vitamins K and D in calcium homeostasis and in bone and cardiovascular health, with the attendant contributions in lowering morbidity and premature mortality, have significant public health contributions," Dr. Kidd concluded. "Both

these nutrients are safe to use, readily available, and relatively inexpensive. Their considerable metabolic overlap and likely synergy of benefits renders these two nutrients powerful tools to upgrade the public health."

The Limits of Calcium (Why Vitamins K2 and D Matter)

Consumers may think, "Well, I'll take calcium and cut out the middle man." That is not possible: If one takes calcium and vitamin D, but are deficient in vitamin K2, they could be worse off than if they took no supplements.

Complicating the problem of calcium deposits is nanobacteria that use this bad calcium to their damaging advantage, forming hard shells of calcium phosphate that serve as defensive armor against the body's immune system, like how a shell shields a clam.

When the shells harden, toxins such as mercury, pesticides, and plastics are trapped in there, which is why it is so hard to get those toxins out of the body. This encapsulated space also forms an excellent hiding area for opportunistic viruses, bacteria, and fungi.

A recent meta-analysis found that people taking calcium supplements were more prone to heart attacks.[11,12] Studies were examined that involved people *taking calcium in isolation,* without complementary nutrients like magnesium, vitamin D, and vitamin K, which help keep the body in balance. In the absence of those other important cofactors, calcium can have adverse effects, such as building up in coronary arteries and causing heart attacks, which is what this analysis detected.

Taking any old isolated calcium supplement and expecting the best is wishful thinking. People are welcome to take calcium—and they should—but they need to balance it with vitamins D and K2. At the very least, because adequate magnesium, silica, omega-3 fatty acids, and weight-bearing exercise are also important to our bones' health.

Conclusion

Vitamins K2 and D have enough promising research to make it an integral part of just about everyone's nutritional routine. Both work together to get the most out of calcium while improving conditions related to cardiovascular health, inflammation, and bone health—issues that are a worldwide concern to the health community.

References:

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