

Calcium Supplements and Dementia – Major Study Busts Long-Held Myth

Analysis by [Dr. Joseph Mercola](#)

September 11, 2026

STORY AT-A-GLANCE

- › Calcium supplements were long feared to increase dementia risk, but new long-term research found no connection between calcium use and cognitive decline, even among women with heart disease or prior strokes
- › The 14.5-year study published in The Lancet Regional Health showed that calcium carbonate supplements did not raise dementia-related hospitalizations or deaths, dispelling decades of concern about vascular calcification or brain damage
- › Your brain and bones rely on nutrient synergy – calcium works best when paired with magnesium, vitamin D3, and vitamin K2, which ensure calcium strengthens bones instead of depositing in arteries or soft tissue
- › Keeping your calcium-to-phosphorus ratio near 1:1 is key for both skeletal and cognitive health, since excessive phosphorus from processed foods, soda, and meat-heavy diets forces calcium out of bones and contributes to arterial calcification
- › The safest way to protect your brain and bones is through whole-food calcium sources such as raw grass fed cheese, yogurt, and eggshell powder, paired with balanced sun exposure and nutrient cofactors that keep calcium working where it should

For decades, older adults have been warned that taking calcium supplements could harm their brains. Those warnings stemmed from small observational studies suggesting calcium might increase dementia risk by promoting vascular calcification or

white matter lesions in the brain. Dementia, meaning a progressive decline in memory, reasoning, and behavior that interferes with daily life, affects 57 million people worldwide, according to the World Health Organization.¹

It's a devastating condition that robs independence, identity, and connection — so it's no surprise that any hint of increased risk sparks concern. Calcium, however, is not a nutrient you can simply eliminate. It's the most abundant mineral in your body and foundational for bone density, heart rhythm, muscle contraction, and nerve signaling. You need enough of it every day, especially as you age.

Yet the debate over how to get it — through diet or supplements — has persisted for years. Some experts argued that supplementing calcium floods your bloodstream and triggers calcium deposits in blood vessels, leading to stroke or cognitive decline. Others maintained that the risk was overstated and lacked solid evidence.

That's why researchers from the University of Western Australia and colleagues conducted one of the most comprehensive long-term studies to date to determine whether calcium carbonate supplements truly raised dementia risk.² What they found directly challenges years of fear-driven headlines and changes how you might think about calcium and brain health.

Long-Term Calcium Supplement Use Found Safe for Brain Health

The post-hoc analysis published in The Lancet Regional Health investigated whether taking calcium carbonate supplements increased dementia risk in older women.³ Researchers followed 1,460 women aged 70 and older who were dementia-free at the start of the study.

Half took 1,200 milligrams (mg) of calcium carbonate daily for five years, while the other half received a placebo. After an additional 9.5 years of follow-up, the researchers found no difference in dementia-related hospitalizations or deaths between the two groups.

- **Older women were the focus because they face the highest risk of both osteoporosis and dementia** — Calcium supplementation has long been prescribed to help offset accelerated **bone loss** in aging women.

However, past observational studies raised fears that supplements could promote calcium buildup in arteries and the brain. To address these concerns, researchers used hospital and death records to track dementia outcomes, providing a rigorous evaluation of calcium's long-term neurological safety.

- **The results showed no increased risk of dementia, hospitalizations, or deaths** — Over the study period, 18.4% of participants experienced dementia events — 16.6% were hospitalized for dementia, and 7.8% died from dementia-related causes.

However, the difference between calcium and placebo groups was statistically insignificant. Calcium users had slightly lower — but not significantly different — rates of dementia compared to the placebo group. This finding held true even after adjusting for genetic, cardiovascular, and lifestyle risk factors.

- **The researchers also found no effect from how well participants followed their supplement plan** — Even among those who took 80% or more of their assigned tablets, known as the per-protocol group, calcium had no adverse effects on cognitive outcomes.

Compliance was similar between groups — about 57% overall — and those who adhered more closely to the treatment had a 27% lower relative risk of dementia, regardless of whether they were in the calcium or placebo group. This suggests healthier behavior patterns, not calcium intake itself, could explain differences in dementia outcomes.

Calcium's Suspected Link to Dementia Was Largely Theoretical — and This Study Disproved It

Critics had speculated that calcium supplements could cause “intracellular calcium overload,” leading to cell death or calcified deposits in brain tissue. Others feared sudden spikes in blood calcium could damage blood vessel linings. However, no such effects were observed in this long-term controlled study. Researchers found no increase in carotid artery plaque or arterial wall thickening — two markers of vascular calcification — among supplement users.

- **The study also addressed previous contradictory research** — Two earlier observational studies claimed calcium users had up to six times higher dementia risk, particularly among women with a history of stroke or brain lesions.^{4,5}

However, those studies were small and relied on self-reported supplement use rather than controlled dosages. By contrast, this randomized controlled trial provided calcium directly to participants and tracked adherence, eliminating much of the recall bias and confounding that weaken observational data.

- **Even women with heart disease showed no increased dementia risk** — Some researchers theorized that calcium supplements could worsen vascular problems or lead to [calcification in the arteries](#), which could reduce blood flow to the brain.

Yet, when researchers separated women with existing atherosclerotic vascular disease from those without, results were the same — no association between calcium supplementation and dementia. The same held true for those with prior strokes or other cardiovascular issues.

Synergistic Nutrients Strengthen Both Brain and Bone Health

Calcium’s behavior inside your body depends on a precise balance with other nutrients that determine where it goes and how it’s used. When that balance is right, calcium strengthens your bones and supports clear thinking. When it’s off, the same mineral can contribute to stiffness, fatigue, or vascular buildup. Understanding this synergy is the key to unlocking calcium’s full benefits for both brain and body health.

- **Cognitive and skeletal health depend on nutrient teamwork, not single nutrients —** Your brain and bones rely on a delicate balance of minerals and vitamins that work together — especially calcium, magnesium, vitamin D3, and **vitamin K2**.

Each plays a distinct role, but it's their combined action that determines how effectively your body absorbs, uses, and stores calcium for long-term health. When these nutrients fall out of balance, calcium could end up in soft tissues like arteries instead of bones, where it's needed most.

- **Vitamin D3 directs calcium to where it belongs —** Often called the “sunshine vitamin,” vitamin D3 helps your intestines absorb calcium efficiently and ensures it's delivered into your bloodstream for proper use. Without adequate vitamin D3, your body struggles to maintain calcium balance.

This imbalance triggers a rise in parathyroid hormone (PTH), which pulls calcium from your bones to maintain blood levels, weakening skeletal strength and disrupting normal cellular processes that influence cognition. Sunlight exposure plays a central role in calcium regulation and brain health. Your skin produces **vitamin D3** when exposed to sunlight, setting off a chain reaction that impacts both bone and brain function.

Proper vitamin D levels help regulate neurotransmitters, support mitochondrial activity, and protect against cognitive decline as you age. A lack of sunlight, on the other hand, makes even a calcium-rich diet less effective because your body can't absorb or use the mineral properly without D3's guidance.

- **Magnesium keeps calcium in check and prevents harmful buildup —** Acting as nature's regulator, **magnesium** ensures calcium moves into bones and teeth instead of soft tissues. When magnesium levels are low, calcium often deposits in arteries, contributing to vascular calcification — a process associated with memory problems and cardiovascular disease. Balanced magnesium intake stabilizes this system, improving both vascular function and the nutrient delivery that fuels brain cells.

- **Vitamin K2 activates proteins that lock calcium into your bone matrix** — Found in fermented foods such as natto, sauerkraut, and aged cheeses like Gouda, Brie, and Edam, vitamin K2 turns on osteocalcin and matrix Gla-protein — two key compounds that guide calcium into bones and away from arteries. This mechanism reduces arterial stiffness, strengthens bone density, and supports the nutrient flow your brain depends on for healthy circulation and oxygen delivery.
- **The four nutrients operate as a unified network that protects cognition** — Calcium builds structural integrity; magnesium controls distribution; vitamin D3 governs absorption; and vitamin K2 ensures proper deposition. When one piece of this puzzle is missing, the system falters.

For example, supplementing calcium without magnesium or D3 could cause imbalances that increase calcification risk, while taking D3 without K2 could direct calcium into soft tissue rather than bone. The goal is harmony, not excess.

The Calcium-Magnesium Balance — Why Both Minerals Matter

Optimal bone health depends on maintaining balance between calcium and magnesium, a mineral that quietly governs calcium's every move. While conventional advice has long prioritized calcium supplementation, the ratio between these two minerals is just as important as their total amounts.

- **Both nutrients are widely underconsumed** — Roughly 3.5 billion people worldwide risk inadequate calcium intake, mostly in low- and middle-income countries.⁶ At the same time, an estimated 45% to 60% of adults in developed nations fail to meet magnesium requirements through diet alone.⁷ Because only about 1% of magnesium is found in blood, routine lab tests often appear normal even when tissue levels are deficient, masking early imbalance.⁸
- **The ratio matters as much as the amount** — Studies suggest a calcium-to-magnesium ratio of about 2-to-1 (ranging from 1.7-to-1 to 2.6-to-1) may be ideal for metabolic and cardiovascular health, but the appropriate amount depends on

magnesium form, diet quality, kidney function, and individual needs.⁹

Modern diets often reach calcium-to-magnesium ratios of 3-to-1 or higher, which limits magnesium absorption and promotes calcium buildup in soft tissue. Ratios exceeding 2.8-to-1 have been linked with inflammation, arterial stiffness, and metabolic stress.¹⁰

Keep in mind that these ratios refer to elemental magnesium, not the weight of the magnesium compound itself. Different forms of magnesium supply different amounts of elemental magnesium, and each type has specific characteristics. For example, systemic balance typically relies on forms like glycinate, citrate, or malate, while magnesium L-threonate supports brain magnesium levels at much lower elemental doses.

For this reason, magnesium needs cannot always be compared by compound weight alone, and intake should be assessed based on total elemental magnesium from both food and supplements, and supplemental forms are best chosen based on your personal health goals and tolerance.

- **A balanced approach works best** — Aim for whole-food calcium sources such as raw grass-fed dairy, leafy greens, powdered eggshell, small fish with edible bones, and algae-derived calcium. For magnesium, lean on legumes, dark leafy greens and, if needed, well-tolerated supplemental forms.

Both minerals act in concert — magnesium activates vitamin D, drives calcium into bone, supports hundreds of enzymatic reactions, and prevents inappropriate calcification, while calcium provides the structural framework for bones and muscles.

If supplementing, limit calcium to 500 mg per dose and select a formula that pairs both minerals in a 2-to-1 ratio. Think of calcium and magnesium as partners, not competitors — each depends on the other for optimal brain, bone, and cardiovascular health.

Keeping Calcium and Phosphorus in Balance Protects Your Brain and Bones

Your **calcium-to-phosphorus ratio** is another key player in how well your body maintains strong bones and clear thinking. Most people think of calcium as the key mineral for bone health, but phosphorus is equally important — and too much of it disrupts the entire system.

Calcium and phosphorus work in tandem to maintain bone density and nerve signaling, yet when phosphorus intake far exceeds calcium, your body compensates by pulling calcium out of bones to restore balance in your blood. This imbalance doesn't just weaken your skeleton — it also stresses your cardiovascular and nervous systems, both of which influence brain health.

- **Modern diets have tilted this ratio in the wrong direction** — The ideal calcium-to-phosphorus ratio is between 1:1 and 1.3:1, meaning you should consume roughly equal amounts of each mineral. However, many people today are closer to 0.3:1 — three times more phosphorus than calcium.

This imbalance is fueled by excessive consumption of animal protein, processed foods, and grain-based products, all rich in phosphorus but low in calcium. When this ratio stays low for years, it accelerates bone loss, increases vascular calcification, and contributes to obesity and premature aging.

- **Excess phosphorus forces calcium to leave your bones, triggering a cascade of problems** — When phosphorus levels rise too high, your PTH increases to restore equilibrium. PTH does this by pulling calcium from bones into your bloodstream, keeping blood calcium stable but at the cost of bone strength.

Over time, this process erodes bone density, increases fracture risk, and contributes to osteoporosis — a condition marked by brittle bones and slow healing. The same process also promotes arterial stiffness and calcium buildup in soft tissues, increasing cardiovascular strain and reducing brain oxygenation.

- **Phosphorus overload often comes from hidden sources** — Processed meats, soda, energy drinks, and packaged snacks frequently contain **phosphate additives** that sharply elevate intake without providing the balancing minerals your body needs.

Even diets high in red meat skew the ratio toward excess phosphorus if calcium sources aren't prioritized. Reading ingredient labels and minimizing processed foods are simple steps that protect both your bones and cognitive function.

- **Managing your calcium-phosphorus ratio is straightforward once you know what to focus on.**
 - Prioritize calcium-rich foods such as raw grass fed cheese and yogurt.
 - Limit processed meats, colas, and fast foods that contain phosphate preservatives.
 - Consider using natural food-based calcium sources such as raw grass fed dairy, small fish with bones, algae-derived calcium, or powdered eggshell. Each provides calcium in a form your body can use, and the right choice depends on your diet, preferences, and tolerance.
 - Add a **magnesium supplement** to help regulate calcium transport and reduce vascular stress.
 - Get sunlight exposure to optimize your vitamin D levels and help your body use calcium efficiently and stabilize hormone balance.

The Best Calcium Sources Come from Food, Not Pills

When you understand how your body uses calcium, you start to see why whole foods work better than isolated supplements. Calcium doesn't act alone — it relies on a network of nutrients, including magnesium, vitamin D3, and vitamin K2, to reach your bones instead of your arteries or brain.

It's also balanced by phosphorus, another mineral that's often too high in modern diets due to processed foods and excessive animal protein. Restoring that mineral harmony keeps your bones strong, your arteries clear, and your mind sharp as you age.

- 1. Start with food-based calcium every day** — You'll absorb calcium best from whole foods that naturally contain the right mineral balance. Include raw grass fed cheese, Greek yogurt, cottage cheese, and cooked collard greens — if your gut tolerates them — regularly.

These foods provide bioavailable calcium that your body recognizes and puts to work immediately. They also deliver trace minerals and natural fats that support hormone balance and nutrient absorption — two key elements of long-term bone and brain health.

- 2. Powdered eggshell provides a pure, natural calcium boost** — **Powdered eggshell** is made mostly of calcium carbonate — the same compound found in your bones — and contains 27 other trace minerals that improve calcium uptake. Take about 1/2 teaspoon of eggshell powder three times a day with meals to provide roughly 1,300 mg of calcium.

I recommend mixing it into smoothies, yogurt, or soups. It's inexpensive, effective, and free of contaminants that often plague bone meal products. If you notice any constipation, consider taking magnesium alongside the eggshell calcium for better results.

- 3. Pair calcium with magnesium, vitamin D3, and vitamin K2** — Calcium and magnesium work like teammates — one tightens muscles and nerves, the other relaxes them. Without enough magnesium, calcium builds up in soft tissues instead of strengthening bones.

Vitamin D3 and vitamin K2 complete the team: D3 helps you absorb calcium efficiently, while K2 activates proteins that guide it into your bone matrix and keep it out of arteries. This trio — magnesium, D3, and K2 — ensures calcium goes exactly where it should, supporting steady energy, vascular health, and sharper cognition.

While leafy greens provide excellent dietary magnesium, due to depleted soils many healthy foods have **lower levels of nutrients** than they used to. As a result, many people still need supplementation to reach optimal magnesium levels. Generally, your magnesium intake should be about half of your calcium intake — so if you're consuming 1,000 mg of calcium, your ideal magnesium intake is about 500 mg.

When taking magnesium, start with magnesium citrate, which is absorbed well but will cause loose stools if you take too much. Gradually increase your dose until that happens, then back off slightly. That's your personal threshold. Once you know it, switch to forms like magnesium glycinate, malate, or threonate, which deliver the benefits without upsetting your digestion.

To optimize your vitamin D levels, aim for sun exposure on bare skin daily, without sunscreen, but avoid exposure during peak hours (10 a.m. to 4 p.m.) until you've eliminated seed oils for at least six months to reduce sun sensitivity. Test your vitamin D levels regularly and aim for 60 to 80 ng/mL (150 to 200 nmol/L).

- 4. Balance your calcium-to-phosphorus ratio for bone and brain protection** — Most people consume far more phosphorus than calcium, which forces your body to pull calcium from your bones to restore balance in your blood. Over time, this weakens bones and promotes calcium deposits in arteries.

To correct this, reduce processed foods, colas, and grain-heavy meals, and increase calcium-rich options such as raw grass fed dairy, eggshell powder, and cooked greens. Aim for a calcium-to-phosphorus ratio close to 1:1 by combining calcium-rich foods with moderate protein intake. This keeps both your skeleton and your cardiovascular system in harmony.

- 5. Use calcium strategically — not excessively** — More isn't always better. Most adults need around 1,000 to 1,300 milligrams of calcium per day from all sources combined, balanced with magnesium, vitamin D and K2. Avoid overdoing protein or processed foods that drive up phosphorus, and remember that consistent, balanced intake — not high doses — creates the real results.

Most adults need about 0.8 grams of protein per pound of ideal body weight (the weight you would ideally be, not necessarily the weight you are now), or for Europeans, approximately 1.76 grams of protein per kilogram. Ideally, get roughly one-third of your protein from collagen sources like bone broth or grass fed ground beef, which contains connective tissue, or glycine to support connective tissue health.

Balanced nutrition supports strong bones, clear arteries, steady energy, and cognitive resilience throughout your life. By shifting toward whole food sources and respecting your body's mineral rhythms, you give yourself the best chance to maintain both skeletal and cognitive health for decades to come.

FAQs About Calcium, Brain Health, and Cognitive Resilience

Q: Does taking calcium supplements increase your risk of dementia?

A: No. According to research published in The Lancet Regional Health, calcium carbonate supplements did **not** increase the risk of dementia, hospitalizations, or dementia-related deaths in older women who took them for five years and were followed for 9.5 years afterward.¹¹ The findings showed no link between calcium supplementation and vascular calcification or cognitive decline.

Q: How do vitamin D3, magnesium, and vitamin K2 work with calcium to protect your brain?

A: These nutrients act as a coordinated team. Vitamin D3 helps your intestines absorb calcium and directs it into your bloodstream; magnesium regulates calcium's movement so it enters your bones instead of your arteries; and vitamin K2 activates

proteins that “lock” calcium into bone tissue. Together, they ensure calcium supports bone strength and brain health without causing harmful deposits in soft tissues.

Q: Why is the calcium-to-phosphorus ratio important for cognitive and bone health?

A: An ideal calcium-to-phosphorus ratio of about 1:1 maintains balance between bone-building and cellular energy processes. Most modern diets deliver three times more phosphorus than calcium due to high intake of animal protein, processed foods, and soda. This imbalance causes calcium to leach from bones, weakens skeletal structure, and promotes calcium buildup in arteries — raising the risk of cardiovascular and cognitive problems.

Q: What are the best food sources of calcium and its supporting nutrients?

A: Whole, minimally processed foods are your best option. Raw grass fed cheese, Greek yogurt, cottage cheese, and cooked leafy greens provide highly absorbable calcium. For magnesium, focus on cooked greens, potatoes, and bananas, but most people need supplementation to support their levels. Vitamin D3 is produced naturally from sunlight exposure, and vitamin K2 is found in fermented foods like natto, sauerkraut, and aged cheeses such as Gouda or Brie.

Q: How can you safely optimize your calcium intake for brain and bone health?

A: Rely primarily on food-based calcium. Raw grass-fed dairy, small fish with bones, algae-derived calcium, and powdered eggshell all supply the mineral in natural forms that work well with your biology. Choose the source that best supports your digestion and overall nutrient intake.

Pair calcium with magnesium, vitamin D3, and vitamin K2 to ensure proper absorption and placement in your body. Avoid overconsuming phosphorus-rich or processed foods, and aim for daily sunlight to maintain ideal vitamin D3 levels. Consistency — not high doses — is what sustains strong bones, clear arteries, and lasting cognitive vitality.

Sources and References

- ¹ [World Health Organization, Dementia](#)
- ^{2, 3, 11} [The Lancet Regional Health October 6, 2025](#)
- ⁴ [Neurology. 2016 Oct 18;87\(16\):1674-1680](#)
- ⁵ [Br J Nutr. 2014 Jul 28;112\(2\):220-7](#)
- ⁶ [Ann N Y Acad Sci. 2022 Mar 5;1512\(1\):10-28](#)
- ⁷ [Nutrients September 2018, 10\(9\):1202](#)
- ⁸ [National Institutes of Health, Office of Dietary Supplements, Magnesium](#)
- ⁹ [Advances in Nutrition 2020 Dec 26;12\(2\):291-297](#)
- ¹⁰ [Adv Nutr. 2016 Jan 7;7\(1\):25-43](#)