

The Calcium Paradox – Calcium Dietary Intake and Supplementation in the Context of Calcium Oxalate Renal Calculus

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Abstract

Renal Calculi, also known commonly as kidney stone is one of the most common manifestations of kidney function dysregulation causing discomfort and alterations to an individual's life. Although kidney stones come in a variety of forms, calcium oxalate stones are the most prevalent kind. These Calcium Oxalate renal stones often arise from various issues like metabolic imbalances, dehydration and dietary imbalances. About 70–80% of kidney stones are calcium oxalate stones, and the lifetime risk of developing kidney stones is 6–12% for the general population. Recent studies have brought forth a fact that contrary to common misconceptions or beliefs, reducing dietary calcium intake does not ensure prevention of calcium oxalate stones. On the other hand, calcium intake restriction may actually be dangerous since it can contribute to calcium deficiency and heighten the risk of other ailments in relation to it. This review highlights the paradox of calcium intake in relation to the formation of most common renal calculi – Calcium Oxalate stones. This paper basically highlights the balance needed between ensuring sufficient calcium intake for bone strength and reducing the risk of renal calculi formation. Achieving a balance is vital. Calcium is essential for building strong bones and supporting essential bodily functions, but an imbalance – specially caused due to its deficiency can be risky. So, it is important to understand the advantages of obtaining calcium from dietary sources, the dangers of calcium deficiency, and the various diagnostic methods to monitor calcium related health concerns.

Keywords: Renal calculi, calcium oxalate stones, kidney stones, calcium intake, calcium deficiency, renal health

INTRODUCTION

Kidney stones, medically termed as “Renal Calculi” are hard, clustered structures that are formed due to crystallisation of various minerals and acid salts in the kidneys by the concentrated urine. When urine contains high concentrations of certain minerals, pebble-like formations can develop – this condition is called Nephrolithiasis. The individual can experience this condition in one or both kidneys.

Kidney stones can range in size from a millimeter or less to ten centimeters. Smaller stones are more likely to pass through the urinary tract on their own. Sharp, irregular, elongated, spherical, or triangular kidney stones are all possible. The texture of these formations could also be smooth or jagged. Kidney stones are most frequently brown, black, or yellow in hue. The urinary tract usually passes minor kidney stones with little to no discomfort. Whereas, a larger stone could become lodged along the way. Calcium stones are the most prevalent kinds of kidney stones contributing to up to 65–70% of kidney stones. 35–70% of all calcium stones are phosphate or calcium oxalate stones, which are

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more prevalent in people. Studies have shown that dietary calcium does not enhance the risk of calcium oxalate stones. Normally, excess calcium that is not utilised by the muscles and bones is sent to the kidneys where it is eliminated as urine. The calcium remains in the kidney and combines with other waste material to produce a kidney stone in the case that it is not flushed out along with urine naturally. These stones can significantly affect an individual's quality of life, causing pain and disrupting bodily functions. There are various factors that can affect the tendency of stone formation in a person like – metabolic disturbances, dehydration, obesity, high dietary oxalate intake, and elevated urinary calcium levels. Among these factors, a common belief is that calcium intake through dietary sources directly causes the formation of calcium stones, which is proven to be untrue but often, this misconception can lead to many reducing their calcium intake. Restriction of calcium intake can lead to calcium deficiency which in itself is dangerous and can lead to other ailments like negative effect on bone health, osteoporosis in women, lack of energy and muscle strength.

Calcium's Role in Human Body

Calcium is a necessary mineral for the human body. The general health and well-being of the human body depend on the mineral calcium. The element responsible for many important physiological functions. Although calcium is well known for supporting strong bones and teeth, its qualities go much beyond just skeletal health. It is integral to numerous physiological processes, including neurotransmission, muscle contraction, and blood clotting, all of which are vital for maintaining homeostasis. Moreover, calcium functions as a key intracellular messenger, regulating processes such as hormone secretion, enzyme activation, and cellular signalling pathways. In cardiovascular health, calcium plays a pivotal role in ensuring normal heart rhythm and facilitating vascular contraction and relaxation. Insufficient calcium intake can lead to compromised bone mineral density, increasing the risk of osteoporosis, as well as impairing neuromuscular and cardiovascular functions. Conversely, adequate calcium levels, achieved through dietary sources or supplementation, are fundamental for supporting metabolic processes, immune function, and overall systemic health. This underscores calcium's multifaceted role as a cornerstone of human physiology and highlights the importance of meeting daily nutritional requirements to prevent deficiencies and promote optimal well-being.

The control of bone strength and density is one of calcium's main functions. A vital structural element of the skeletal system, calcium aids in the development and maintenance of bone health. Reaching optimum bone mass throughout growth and development requires consuming enough calcium, which helps avoid the development of osteoporosis in later years of life.[1] In addition to its structural function, calcium is continuously absorbed and released to maintain ideal bone density during the dynamic process of bone remodelling. Calcium supplementation lowers the risk of vertebral fractures and bone loss (the bones around the spinal cord). Higher bone mass in maturity can result from childhood calcium consumption, such as that found in milk. Later in life, fracture risk may be decreased by this increase in bone density. Additionally, calcium is essential for controlling neurotransmission, which is how nerve impulses travel throughout the body. As secondary messengers, calcium ions help electrical signals travel by causing the release of neurotransmitters at the synaptic cleft. This mechanism is essential for proper nervous system function, including muscle control, cognitive processes, and sensory perception. Calcium (Ca^{2+}) is a ubiquitous and indispensable mineral that plays a pivotal role in an array of physiological processes within the human body. In addition to its well-known role in preserving skeletal integrity, calcium is an essential signalling molecule that controls a variety of cellular processes, including hormone secretion and neuromuscular excitability. At the cellular level, calcium ions (Ca^{2+}) act as versatile messengers, triggering a myriad of intracellular responses. [2]

Blood clotting in the body is significantly influenced by calcium as well. When a blood vessel is damaged, a process called coagulation, or blood clotting, occurs to halt the bleeding. Platelets and clotting factors cooperate to create a clot across the injured blood artery. Calcium is one of the substances involved in the complex process of clotting.

Dietary Recommendation of Calcium

The recommended dietary allowance for calcium is a crucial guideline that helps individuals, healthcare professionals, and policymakers understand the appropriate amount of this essential mineral necessary for maintaining optimal health. Different age groups and phases of life have varying calcium intake recommendations - in healthy adults, the typical daily intake of calcium should be around 1000-1300 mg, with approximately 400 mg being absorbed through the intestine and the remaining portion excreted through faeces and urine. This intake level ensures that the body's calcium homeostasis is maintained, with the extracellular pool of calcium containing about 900 mg, and the majority being reabsorbed by the renal tubules. While the average calcium intake is around 1000 mg/day, there are wide variations based on individual dietary patterns and the consumption of dairy products, which are a rich source of calcium. Supplementation with vitamin D, which enhances calcium absorption, may also be beneficial, particularly for older adults who are at a higher risk of bone loss and fractures (Table 1).

There are many sources of dietary calcium that can be incorporated in an individual's diet. Dairy sources which include items like Milk, yogurt, cheese and other dairy products that are rich in calcium. Fortified foods are also rich in calcium, food items that are dairy alternatives like soy milk, tofu, soya chunks and fruit juices.

Most common source of naturally calcium rich food are dark green leafy vegetables like kale, broccoli and turnip. Fish like sardines and salmon are other sources of calcium. Whereas nuts and seeds like almonds, sesame and chia are also a good source of calcium. Lastly, there are legumes and grains. Legumes and grains are a rich source of calcium as well. The type of food has an impact on how much calcium is absorbed. For instance, about 5% of calcium is absorbed from spinach, compared to roughly 30% from dairy products and fortified meals. This is because some plant chemical can render calcium indigestible. [4].

Calcium Deficiency Diseases or Ailments

Because calcium is necessary for so many body processes, a lack of it can affect not only the muscles, bones, and teeth, but also the mental well-being of the person. If inadequate food intake is the origin of the deficiency, there are often no early symptoms. This can result in brittle bones, or osteoporosis, if left untreated. There are other issues that can be triggered due to the lack of efficient calcium intake –

Muscle issues

A person with a calcium deficiency may have muscle pains, cramps, and spasms when walking or moving, as well as pain in their arms and thighs, numbness and tingling sensations in the hands, arms, feet, and legs, as well as around the mouth. Although these sensations could come and go, activity usually does not make them go away.

Table 1. Recommended allowance data [3].

Age	Male (mg)	Female (gm)	Pregnant (mg)	Lactating (mg)
0-6 months	200	200		
7-12 months	260	260		
1-3 years	700	700		
4-8 years	1,000	1,000		
9-13 years	1,300	1,300		
14-18 years	1,300	1,300	1,300	1,300
19-50 years	1,000	1,000	1,000	1,000
51-70 years	1,000	1,200		
>70+ years	1,200	1,200		

Extreme fatigue

Low calcium levels can cause extreme exhaustion, which is identified by a loss of energy and an overall feeling of slowing down. It can also lead to insomnia. Fatigue associated with a calcium deficiency can also manifest as lightheadedness, dizziness, and brain fog, which is characterised by a loss of attention, forgetfulness, and confusion. Signs of skin and nail Dry skin, dry, broken, or brittle nails, coarse hair, alopecia (patterns of hair loss), eczema, or inflammation of the skin that can result in dry or itchy areas, or psoriasis are all symptoms of a chronic calcium shortage.

Osteopenia and Osteoporosis

The bones need a lot of calcium to be strong, even though they store it well. Low total calcium levels can cause the body to take some calcium away from the bones, which makes them brittle and more vulnerable to damage. Over time, osteopenia—a decrease in the mineral density of the bones—can result from inadequate calcium intake. This can lead to osteoporosis, which increases their vulnerability to fractures, in addition to pain and problems with the body's posture.

Severe PMS

Severe premenstrual syndrome (PMS) has been associated with low calcium levels. Some clinical trials have shown that calcium supplements can reduce PMS symptoms like irritability, anxiety, depression, cramps, and headaches. [6] According to current study, taking 500 mg of calcium daily helped lessen PMS symptoms.

Dental Issues

Numerous dental problems can result from a calcium shortage, including tooth decay since an individual's enamel deteriorates when calcium levels are low, which makes cavities more easily caused by acids and bacteria.

Low calcium levels might make teeth more vulnerable to fracturing and cracking because calcium strengthens tooth enamel. Teeth may become more sensitive to hot, cold, or sweet foods as enamel weakens. The gums likewise require calcium, and a lack of it can lead to inflammation or increase the risk of gum disease. Teeth may appear stained or dull in some cases. A lack of calcium can have an impact on the jawbone's development, which supports and aligns the teeth.

Detection of Calcium Deficiency

It's important for women to have their bone health evaluated regularly, especially postmenopausal women. Bone mineral density tests, such as DXA (dual-energy X-ray absorptiometry), can determine the extent of bone loss and help in planning an effective treatment strategy, including appropriate supplementation. Important aspects of managing osteoporosis in women include changing one's lifestyle, including regular physical activity, quitting smoking, consuming less alcohol, and making sure one is getting enough calcium and vitamin D. Calcium deficiency, also known as hypocalcaemia, can be identified through various diagnostic methods to assess its presence and severity. In order to avoid possible consequences linked to low calcium levels, such as osteoporosis, cramping in the muscles, and a higher risk of fractures, early detection is essential. Here are the primary methods used to detect calcium deficiency:

Serum Calcium Levels

The most straightforward and commonly used method to detect calcium deficiency is a blood test measuring serum calcium level. This test measures the blood's calcium content and falls into one of the following categories:

- *Total Serum Calcium:* This measures both the ionized (free) calcium and protein-bound calcium (primarily to albumin). A normal total calcium level ranges between 8.5 to 10.2 mg/dL in adults. [12]

- *Ionized Calcium*: This measures the free, biologically active form of calcium in the blood and provides a more precise assessment of calcium status, particularly in conditions where protein levels are abnormal. Around 4.4 to 5.4 mg/dL is what a normal ionised calcium level is.
- *Corrected Calcium (Adjusted Calcium)*: For patients with abnormal serum albumin levels, a corrected calcium calculation may be necessary to accurately assess calcium deficiency.

24-Hour Urine Calcium Excretion

A 24-hour urine calcium test can be used to evaluate the body's calcium equilibrium. This test measures the amount of calcium excreted in the urine during a 24-hour period. Reduced calcium excretion may indicate inadequate dietary intake or absorption issues. Normal urine calcium excretion ranges between 100 to 300 mg/day in adults.

Levels of Parathyroid Hormone (PTH)

Parathyroid hormone is essential for the metabolism of calcium. Elevated PTH levels often indicate low calcium levels, as the body compensates by increasing calcium resorption from bones and reducing calcium loss through urine. Measuring serum PTH levels can help identify primary or secondary hyperparathyroidism, which is frequently associated with calcium deficiency. The normal PTH range is typically between 10 to 65 pg/mL, depending on the laboratory.

Bone Density Tests

Osteoporosis, which is frequently caused by a chronic calcium deficiency, is diagnosed with bone mineral density (BMD) tests, such as dual-energy X-ray absorptiometry (DXA). Although these tests do not measure calcium directly, they provide indirect evidence of calcium deficiency by assessing bone strength and density. Lower BMD scores are indicative of calcium-deficient bone health.

Symptoms Assessment

Clinicians also evaluate clinical symptoms of calcium deficiency, which can include muscle cramps, spasms, tingling or numbness in the fingers and around the mouth, and in severe cases, seizures or tetany. These symptoms are more readily observed when calcium deficiency is significant or acute.

Dietary and Lifestyle Assessment

A detailed dietary history can provide valuable insights into potential calcium deficiency. Questions regarding dairy consumption, leafy green vegetables, fortified foods, and lifestyle factors like smoking, alcohol consumption, and physical activity can indicate calcium-deficient habits. Additionally, factors like lactose intolerance or malabsorption disorders (e.g., celiac disease) that interfere with calcium absorption should be considered.

Imaging and Radiographic Findings

In cases where calcium deficiency has led to osteoporosis or osteocalcin, imaging studies such as X-rays may show bone demineralization and thinning, indicative of calcium depletion.

Calcium Oxalate Formation

The formation of calcium oxalate stones is a complex process that involves multiple factors, and it is important to debunk the myth that high calcium intake directly causes these stones. The process begins with the supersaturation of urine with calcium and oxalate, which are the primary components of calcium oxalate stones. Calcium can bind with oxalate in the urine, forming insoluble calcium oxalate crystals that may eventually precipitate out and lead to stone formation.

However, calcium intake does not directly cause these stones. In fact, calcium plays a protective role in preventing renal calculi. When dietary calcium is consumed, it binds with oxalate in the intestines, forming a calcium-oxalate complex that is not absorbed into the bloodstream. As a result, less oxalate enters the kidneys and there is a lower chance of oxalate-induced stone development. Moreover,

calcium enhances the solubility of oxalate by preventing its reabsorption in the renal tubules and promoting its excretion through urine. This mechanism underscores the protective role of dietary calcium in reducing the risk of calcium oxalate stones, challenging the myth that calcium intake contributes to their formation.

Adequate calcium intake, therefore, helps maintain the balance of calcium and oxalate in urine, thereby preventing the supersaturation required for stone formation. Furthermore, it enhances the urine's buffering capacity, making it less likely for oxalate to form insoluble crystals. This demonstrates that the relationship between calcium intake and kidney stones is not as direct and negative as once thought, but rather calcium can actually play a beneficial role in stone prevention when balanced appropriately within one's diet.

Homeostasis and Calcium Absorption

Calcium homeostasis is the process by which the body regulates the level of calcium in the blood and body, and it involves the absorption of calcium from the diet and the excretion of excess calcium through the kidneys. Homeostasis is the self-regulating mechanism that allows biological systems to remain stable while adapting to shifting environmental factors. Homeostasis is important in the context of calcium metabolism because it regulates the balance of calcium levels in the body which is necessary for many physiological functions. [7] Research implies that the development of these calculi is closely linked to dysregulation in calcium metabolism and homeostasis within the body. [8]

Maintaining physiological processes including bone health, neuron transmission, and muscle contraction depends on the strictly controlled process of calcium homeostasis. Vitamin D-regulated active transport pathways aid in the small intestine's primary calcium absorption. After being absorbed, calcium is dispersed throughout the body, with the bones and teeth storing a large amount of it. The kidneys are essential for calcium excretion because they make sure that extra calcium is removed while preserving enough for balance. Serum calcium levels are kept within a specific range via hormonal control, which is mostly mediated by calcitonin and parathyroid hormone (PTH), keeps serum calcium levels within a specific range. Hypercalciuria or hypocalcaemia, which upset this equilibrium, can have repercussions later on, such as a higher risk of kidney stones. Assessing how dietary and supplementary calcium affect the risk of calcium oxalate stones requires an understanding of these pathways.

The Interaction of Dietary Calcium with Oxalate

Calcium and oxalate are two essential dietary components that play a crucial role in the formation of kidney stones, a prevalent health issue. Kidney stones and other health problems can be influenced by the ratio of calcium to oxalate, which interact in the gastrointestinal system. The risk of calcium oxalate stone formation is significantly influenced by the interaction that takes place in between dietary calcium and oxalate. Oxalate and calcium create a bond in the intestine that enables them to leave the body together as feces. Insufficient calcium causes the excess oxalate to have nothing in the intestine to bind to, which results in the formation of a calcium oxalate stone in the urine [9].

Recent studies have established a direct correlation between obesity, overweight, and higher body fat percentages with the incidence of calcium-based kidney stones [10]. This connection is attributed to the impact of obesity on the overall excretion levels of uric acid, sodium, calcium, and citrate, all of which contribute to the formation of various types of kidney stones. This is one of the reasons why individuals with these types of stones or the tendency to develop them may be advised to depend less on a high oxalate diet for their regular dietary practice.

Need of Calcium balance for prevention

When there's too much oxalate and not enough calcium, oxalate can be absorbed into the bloodstream and form kidney stones. Oxalate and calcium combine in the colon and exit the body as stool. Oxalate enters the bloodstream and ends up in the urine when there is insufficient calcium. Therefore,

maintaining a balanced calcium intake is important for preventing kidney stones. Calcium in the intestines binds with oxalate, preventing oxalate from being reabsorbed into the body and passed into the urine and without calcium, oxalate can increase the risk of calcium oxalate stones [11].

Sometimes, individuals who develop renal calculi believe that they should limit their calcium intake because of excessive calcium presence in their urine. There is no research that supports this practice. Calcium from a diet is necessary for the body to maintain bone health and to maintain calcium in the body, individuals are encouraged to consume food groups that are rich in calcium as guided appropriately by the RDA for different genders and age groups. In cases where calcium intake from dietary sources is not enough to meet daily requirements, calcium supplementation may be required.

Calcium Supplementation

Dietary calcium is typically sufficient to meet the needs of the body but in some cases, where typical dietary intake of calcium is not efficient, supplements are introduced. Calcium supplementation may be an option for the individuals with diets that do not provide enough calcium. Since it is a mineral that is essential for bone health and other bodily functions, individuals are suggested supplementation of calcium. Common calcium supplements include – calcium carbonate, calcium citrate or vitamin D. Vitamin D is significant for the absorption of calcium. These kinds of supplements might be recommended to people with a predominantly vegan or vegetarian diet, people who have lactose intolerance or similar gut issues, celiac disease or inflammatory bowel disease which limits their daily intake of dairy based products and people who may excrete more calcium because of consuming sodium and protein in large amounts. In such cases, calcium through supplementation may meet the individual's calcium requirements. Common calcium supplements contain a variety of types of compounds, different amounts of calcium or elemental calcium is present in each supplement. The elemental calcium content of calcium carbonate is 40%, while that of calcium citrate is 21%. There is 9% elemental calcium in calcium gluconate and calcium lactate has 13% elemental calcium [4].

Numerous types of calcium supplements are available in Indian markets. The various concentrations of ionic calcium content for calcium in its various forms, such as carbonate, citrate, acetate, phosphate, lactate, and gluconate, are listed below (Table 2):

The real amount of calcium in a supplement is called elemental calcium, thus it's critical to carefully study labels and comprehend the supplement's components. This absorbed calcium contributes to bone development and other health benefits. Approximately 38% of calcium phosphate is elemental calcium, so that 1,000 mg of calcium phosphate equals 380 mg of elemental calcium. About 21% of calcium citrate is elemental calcium, which means that 1,000 mg of calcium citrate has 210 mg of elemental calcium in it. 1,000 mg of calcium acetate yields 250 mg of elemental calcium since calcium acetate is 25% elemental calcium. 130 mg of elemental calcium are present in 1,000 mg of calcium lactate, which is approximately 13% of elemental calcium. There are two main kinds of calcium supplementation: citrate and carbonate. Since calcium carbonate is the least priced, it's frequently a wonderful first pick. Other forms of calcium, lactate and gluconate, are also found in supplements. Other vitamins and minerals are also combined with some calcium supplements. For example, certain calcium supplements could also include magnesium or vitamin D.

Table 2. Different types of Calcium Supplements [5].

Name of supplement	Elemental Calcium	Calcium (mg/g)
Calcium carbonate	40%	400
Calcium phosphate	38%	383
Calcium citrate	21%	210
Calcium acetate	25%	253
Calcium lactate	13%	130
Calcium gluconate	9%	93

The most available kind of tablets is calcium carbonate. It must be taken with meals for proper absorption, though, and may result in bloating and constipation. More pills are needed to provide the recommended dosage of calcium citrate, which is frequently more costly than calcium carbonate. It has a lower risk of GI adverse effects and is not reliant on gastric acid for absorption. Regardless of the calcium preparation, the dosage should not exceed 500 mg each dose for best absorption. The dosage should be split for those who need more than 500 mg each day. When consumed in excess, all nutrients have negative effects, such as obesity from consuming too many calories. Both observational studies and meta-analyses have produced conflicting data about elevated calcium intake with cardiovascular mortality.

In recent studies, there has been evidence that scheduled calcium supplementation has been shown to help prevent renal calculi. [11] Calcium supplements should be taken with meals to avoid increasing the risk of calcium oxalate nephrolithiasis. Different calcium supplement timing may affect how well calcium and oxalate are absorbed in the gastrointestinal tract and may be associated with different risks of calcium oxalate nephrolithiasis. A study found that when patients took calcium supplements with meals, their urine oxalate levels considerably decreased as compared to the comparable baseline. On the other hand, taking a calcium supplement before bed did not change the baseline levels of urine oxalate. Calcium supplementation at nighttime significantly enhanced calcium oxalate activity, although taking calcium with meals did not significantly increase it when compared to the comparable baseline levels.

CONCLUSION

An excessive amount of oxalate can be taken into the bloodstream and result in kidney stones when there is insufficient calcium. Calcium and oxalate combine in the intestine and exit the body as stool. Oxalate enters the bloodstream and ends up in the urine when there is insufficient calcium due to not being excreted together with it. Thus, it's critical for individuals to keep their calcium intake balanced in order to avoid kidney stones. Because oxalate binds with calcium in the intestines and prevents it from being reabsorbed into the body and expelled into the urine, it can increase the risk of calcium oxalate stones when calcium is not present. People who develop renal calculi, especially calcium oxalate stones, sometimes think that because their urine contains too much calcium, they should cut back on their calcium intake. This practice is not supported by any study. The body needs calcium from food to maintain healthy bones, and in order to keep calcium in the body, people are encouraged to eat foods high in calcium as recommended by the RDA for each gender and age group. It can be necessary to take calcium supplements if daily requirements cannot be met by dietary consumption alone.

Calcium is a crucial mineral for the human body's overall health and well-being. This part is responsible for several essential physiological functions. Calcium's significance extends far beyond skeletal health, despite its well-known role in maintaining strong bones and teeth. It is essential for several physiological functions, such as blood coagulation, muscle contraction, and neurotransmission, all of which are necessary for preserving homeostasis. Furthermore, calcium is an essential intracellular messenger that controls cellular signalling pathways, hormone production, and enzyme activity.

Regular evaluations of women's bone health are necessary, especially for those who have experienced menopause. Tests for bone mineral density, such as dual-energy X-ray absorptiometry (DXA), can assess the degree of bone loss and assist in developing a successful treatment plan that includes the right supplements. Important aspects of managing osteoporosis in women include changing one's lifestyle, including regular weight-bearing activity, stopping smoking, drinking less alcohol, and making sure one is getting enough calcium and vitamin D. The presence and severity of calcium shortage, sometimes referred to as hypocalcaemia, can be determined using a variety of diagnostic techniques. In order to avoid possible consequences linked to low calcium levels, such as osteoporosis, cramping in the muscles, and a higher risk of fractures, early detection is essential.

Although dietary calcium is usually adequate to meet the body's needs, supplements are sometimes added when the body cannot effectively obtain calcium from the food. For those whose diets don't contain enough calcium, calcium supplements might be an option. People who follow a mostly vegan or vegetarian diet, have lactose intolerance or other related digestive disorders, or have celiac disease or inflammatory bowel disease that restricts their daily use of dairy products may be advised to take Calcium supplements. Since calcium is a mineral that is necessary for healthy bones and other body processes, individuals can obtain it through the intake of supplements, as advised by their healthcare providers.

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