Novel Source of Calcium for Osteopenia and Osteoporosis

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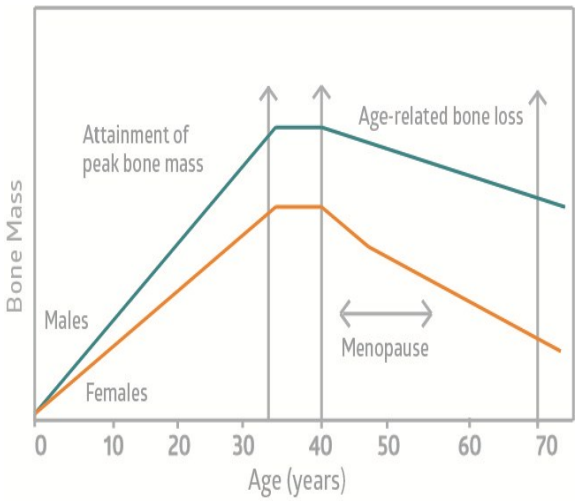
ABSTRACT: At an age above 40, osteopenia is a most common problem for both men and women due to inadequate calcium levels in the body. One member in every family may suffer from osteopenia. After age 40, every year a person may lose 1% of his bone. Bone loss is more in case of women because most women are not ingesting adequate calcium and other minerals from diet. Due to hormonal change bone loss is more (2%) in post-menopausal women; in order to overcome calcium supplements are provided to strengthen bones. Even though there are different traditional calcium supplements available which are originate from rock/lime stone contains calcium carbonate have various cardiovascular side effects like myocardial infarction, heart attack, and stroke. In order to reduce this cardiovascular risk Algae Calcium was introduced. Algae Calcium produced from the red algae, *Lithothamnion* species, (*L. calcareum*) which is found in just three locations in the world. AC from plant origin has calcium ions that are attached to carbonate molecules, chloride molecules, sulphate molecules, and more. AC also contains 13 other minerals known to support bone health, plus an unquantified number of organic phytonutrients. AC better absorbed with 200 – 400% greater mineralization and proliferation of bone building cells, clinically proven that bone mineral density is increased with AC. No adverse effects were reported in the blood chemistry tests, self-reported quality of life and daily tracking reports. Algae calcium is superior to traditional calcium. Hence, AC can be developed as a novel anti-osteoporotic supplement.

KEY WORDS: Osteopenia, Osteoporosis, Calcium Supplements, Algae Calcium,

ABBREVIATIONS: AC- Algae Calcium, BMD- Bone Mineral Density, RCT- Randomized Controlled Trials

SUMMARY:

About 70percent of bone made-up of calcium, this is an essential mineral to our body and plays an important role in variety of physiological activities. Along with calcium other minerals boron, manganese, selenium, silica, strontium, vanadium, zinc, nickel, copper, magnesium, potassium and phosphorous also have a positive effect on our bone health. The natural process of aging can cause calcium deficiency leads to osteopenia and osteoporosis. [1] Osteopenia is low bone density where as osteoporosis is a condition in which bone susceptible to fracture. [2] Osteopenia is a most common problem for both men and women at an age above 40 due to inadequate calcium. After age 40, every year a person may lose 1% of his bone, it is more in case of women for the first 6 – 10 years after menopause due to hormonal change and most women are not ingesting adequate calcium and other minerals from diet leads to 2% bone loss per year.



There are different treatments available for osteopenia and osteoporosis. Several reviews reveal the need of addition of calcium supplements for treatment of osteopenia. [3] Use of calcium, or calcium in combination with vitamin D supplementation, in the preventive treatment of osteoporosisis effective in people aged 50 years or older.[4] So, Calcium and vitamin D proved a cost effective treatment for osteoporotic patients.[5] The recommended daily amount of calcium is 1000mg a day for an adult. Even though calcium is only effective treatment in the management of osteopenia and osteoporosis, several randomized controlled trials (RCTs) found an increased risk of various cardiovascular events, including myocardial infarction, stroke, and cardiovascular deaths, in the intervention arm with calcium supplementation. [6, 7, 8] Reassessment of calcium supplements is very important [9] due to cardiovascular risk.

Calcium is absorbed differently by the body depending on whether we get it from rocks or plant. [10] Plants break down the minerals in soil into tiny particles which are more readily useable by the body than eating the soil or rocks. Algae dietary supplements are produced from the red algae, *Lithothamnion calcareum*, which is found in just three locations in the world[11], including the south-west coast of Ireland and Iceland. The algae itself gathers minerals naturally from the sea during its lifetime. At the end of its life it leaves behind skeletal remains that contain calcium, magnesium, iron and several other trace minerals which are excellent for bone tissue and general health. This produces positive effects on digestion and absorption of calcium. Algae are at the top of an elite category of foods that have all the trace minerals necessary for optimum bone health, as well as unusually high levels of calcium. Algae calcium behaves like a plant so it does not produce any vascular complications which are reported by other traditional calcium supplements form lime rock. There is an increase in BMD observed in patients given with algae Calcium [12]. Post-menopausal women each took different Algae Calcium formulations produced increasing bone density in one year, where as traditional calcium supplements do not increase bone density [13]. Algae Calcium reduces oxidative stress when compared to calcium carbonate and calcium citrate. A study focused on the proliferation, mineralization and oxidative stress in cultured human osteoblast cells, showed that Algae Calcium increased alkaline phosphatase activity 200 percent more effectively than calcium carbonate and 250 percent better than calcium citrate. In addition, Algae Calcium outperformed calcium carbonate and calcium citrate by 300 and 400 percent respectively on DNA synthesis – the ability of these osteoblasts to produce new bone building cells. [14] These findings suggest that AC may serve as a superior calcium supplement as compared to other calcium salts. A part from its

effectiveness AC reports no adverse toxicological effects to the pregnant rat or its developing offspring. Overall, no significant toxicities of AC were observed in toxicity models. [15] Therefore, AC had a broad-spectrum safety profile. Hence, AC can be developed as a novel anti-osteoporotic supplement in the near future.

CONCLUSION: As traditional calcium absorption is low and it produces increased risk of cardiovascular effects like myocardial infarction, heart attack, stroke and cardiovascular death, Algae Calcium from plant is a novel source for the treatment of osteopenia and osteoporosis without cardiovascular risk and good safety profile. More research is needed to support this work.

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