Cal-M™

DESCRIPTION
Cal-M is a phosphorus-free, calcium-magnesium complex with vitamin D3 and synergistic B vitamins designed to provide the nutritional foundation for muscle tissue stabilization and repair.

FORMULA
Three tablets provide:
- Calcium (calcium lactate) ................................. 250 mg
- Magnesium (magnesium oxide) ......................... 200 mg
- Vitamin D3 (cholecalciferol) ............................. 400 IU
- Vitamin B1 (mononitrate) ................................. 45 mg
- Vitamin B6 (HCl) ................................................. 45 mg
- Niacin ............................................................. 90 mg

DIRECTIONS
Three tablets daily. Keep out of the reach of children.

HOW SUPPLIED
White, oblong tablets; 90 per bottle

Other ingredients
Stearic acid (vegetable source), calcium stearate (vegetable source), methyl cellulose and modified cellulose gum.

BACKGROUND:
Minerals - Calcium (Ca) and magnesium (Mg) are essential minerals which are the primary mechanical components of bones and teeth and absolutely required for voluntary and involuntary muscle contraction, nerve firing and energy (ATP and GTP) production⁴. These two nutrients also play central roles in membrane selective permeability, electrolyte balance and salt transport. While calcium and magnesium deficiencies are often related to osteoporosis, magnesium deficiency can also result in muscle twitching, muscle wasting and puzzling patient nervousness. Both metals are cofactors in dozens of critical enzymes of metabolism; because of this deficiencies always become manifest. The first serious consequences are detectable as disturbances of muscle function displayed as cramping and spasms. The nutrients in Cal-M are balanced towards delivering a high ratio of magnesium to calcium, considering that magnesium is most often deficient in the modern diet – especially for those recovering from injury. Because it is phosphorus-free, Cal-M is ideal for patients in whom it is desirable to raise calcium and magnesium levels without adding any additional phosphorus to the diet.

Vitamin D3 - is necessary not only for absorption of calcium from the gut but for calcium utilization by bone forming, osteoblast cells. In addition, vitamin D3 is responsible for the quick release of sequestered calcium in muscle cells for stimulation of muscle contraction⁵. The rapid release of calcium in many tissues, signaled by vitamin D3, has been implicated in the metabolism of hepatocytes, enterocytes and parathyroid cells. Vitamin D3 is also important for...

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suppressing autoimmune response by interacting, without involving calcium, in the manner of a hormone with immune cells\(^3\). D3 is much preferred over D2, with much higher activity than the related vitamin D2\(^4\). Recent published studies report a large number of North Americans are deficient in this vitamin, especially over the winter season, and the cost to our society by this epidemic is enormous\(^5\). Lack of vitamin D3 is blamed for a huge proportion of adult fractures, especially during winter.

**Vitamin B6 (pyridoxine)** - is the key factor required for the formation of \(\gamma\)-aminobutyrate (GABA), a derivative of glutamate involved in neuronal regulation. \(\gamma\)-Aminobutyrate is the primary inhibitor of pain neurotransmission with GABA being quickly synthesized in the brain by local decarboxylases\(^6\). Pyridoxine is the essential vitamin required for the one-step, catalytic conversion from glutamate to \(\gamma\)-aminobutyrate. Many drugs, for instance anti-mycobacterial agents, induce a state of pyridoxine deficiency by depleting the cells of this important, water-soluble vitamin. Supplementation with pyridoxine alleviates potential drug side-effects and promotes localized pain relief via GABA biosynthesis.

**Vitamin B1 (thiamin)** – one traditional and current treatment for pain is alcohol. Consumption of this drug by patients is almost totally beyond the control of the health practitioner. While a few ounces may be just what the doctor ordered for acute conditions for short periods, chronic use leads inevitably to thiamin deficiency. While all mammalian cells suffer from thiamin deficiency during alcoholic episodes, the neurons seem particularly sensitive to thiamin depletion. It becomes crucial to supplement the diet with thiamin to avoid neural damage from alcohol use, for whatever reason\(^7\).

**Niacin** - is an essential, water-soluble vitamin required for proper energy metabolism. It is the functional portion of the famous coenzymes NAD, NADH, NADP and NADPH, where niacin is covalently bound with ribose and adenine. These coenzymes are required for the function of several hundred enzymes required by mammalian metabolism. The NAD series are intimately involved with energy production (ATP and GTP) in the mitochondria, sugar oxidation, reduction of hemoglobin back to the functional form after heavy drug use and reverses lipid peroxidation after tissue damage.

**References**