



Magnesium + Malic Acid: One-Two Punch for Pain & Fatigue

by Karen Lee Richards*

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A combination of magnesium and malic acid tops the list of recommendations for easing pain and fatigue, especially for those with fibromyalgia or ME/CFS.

Magnesium (Mg) is one of the most important nutrients required by our bodies. It is necessary for more than 300 biochemical reactions in the body and is essential to human life. A few of magnesium's functions include:

- Maintaining normal muscle and nerve function.
- Keeping heart rhythm steady.
- Supporting a healthy immune system.
- Keeping bones strong.
- Regulating blood sugar levels.
- Promoting normal blood pressure.
- Supporting energy metabolism and protein synthesis.(1)

Since our bodies don't produce this essential nutrient, it is critical that we replenish our supply of magnesium daily through diet and/or supplementation.

According to a 1985 USDA survey, 75% to 85% of American adults consume less than the recommended daily amount of magnesium.(2)

Why We're Not Getting Enough Magnesium

One reason Americans tend to run low on magnesium is that we eat a lot of processed foods, which usually contain very little magnesium. Magnesium is mostly found in green vegetables, nuts and seeds, whole grains, some legumes, and – you're going to love this – chocolate.

But wait - that's not the whole story. What we gain by eating those magnesium-rich foods can be depleted by eating breads and pastas made from bleached and refined flour. Natural diuretics like coffee, tea and alcohol are also magnesium depleters.

A poor diet is not the only culprit, though. Another big reason so many people have a magnesium deficiency is that several commonly prescribed drugs strip our bodies of magnesium. These include oral contraceptives, estrogens, diuretics, corticosteroids, some diabetes drugs, and a number of antibiotics.

A magnesium deficiency can be related to a surprising number of illnesses including fibromyalgia, ME/CFS, migraines, type 2 diabetes, osteoporosis, asthma, high blood pressure, heart disease and PMS.

It can be difficult to detect a magnesium deficiency.

Most nutritional deficiencies can be revealed through a blood test. But because adequate serum levels of magnesium are essential for the heart to function properly, the body works overtime to maintain its blood serum Mg levels - at the expense of our cells and bones. So, even if a blood test shows normal serum magnesium levels, your cells, bones, and muscles may be severely deficient.

Fibromyalgia and Magnesium Deficiency

Researchers have found that people with fibromyalgia are commonly deficient in magnesium. Therefore, it's not surprising that the symptoms of a magnesium deficiency are quite similar to many of the symptoms common to FM:

- Insomnia
- Fatigue
- Irritability
- Headaches
- Muscle spasms and cramps

- Poor memory
- Confusion
- Nervousness
- Anxiety
- Depression

Several of magnesium's functions are directly related to FM symptoms:

Magnesium is involved in the production of serotonin. Serotonin is a neurotransmitter involved in regulating sleep cycles, pain perception, mood and the immune system. People with fibromyalgia typically have low serotonin levels, which can be related to the sleep disturbances, increased pain and mood problems they often experience.

A magnesium deficiency can cause an increase of substance P. Substance P is a neurotransmitter that serves as a pain messenger. People with fibromyalgia usually have exceptionally high levels of substance P, which can contribute to their hypersensitivity to pain.

Magnesium activates adenosine triphosphate (ATP). Energy is supplied to our bodies by the mitochondria in the form of ATP. Researchers have found evidence of mitochondrial dysfunction in fibromyalgia patients, which would result in the severe fatigue reported by most.(3)

Fibromyalgia and Malic Acid Deficiency

Researchers have found that people with fibromyalgia have decreased levels of oxygen in their muscles, also known as *muscle hypoxia*. Biopsies of those muscles have shown muscle tissue breakdown, mitochondrial damage, and low levels of ATP, which helps explain the widespread muscle pain characteristic of FM.

Evidence suggests that malic acid can help ease pain caused by muscle and tissue hypoxia. It allows the body to make ATP - and thereby energy - more efficiently, even under low oxygen or hypoxic conditions. Malic acid also enhances cellular stamina and endurance. (Malic acid is derived from food sources such as tart apples and is used/synthesized in the mitochondria as part of the ATP-producing citric acid or 'Krebs' cycle.)

As a team, malic acid and magnesium work together especially well to fight aluminum toxicity, which is thought to play a role in fibromyalgia. Malic acid acts as a potent aluminum detoxifier, while magnesium prevents future aluminum build-up.

Magnesium and Malic Acid Combo Reduces FM Symptoms

In a 1992 study, 15 fibromyalgia patients were given 300-600 mg of magnesium and 1200-2400 mg of malic acid for periods of four and eight weeks. Participants reported reductions in pain across a tender point index. Notably, six of the patients experienced improvement in 48 hours.(4)

A clinical trial conducted in 1995 tested a proprietary tablet containing 200 mg of malic acid and 50 mg of magnesium on 24 fibromyalgia patients. After taking three of the low-dose tablets twice a day for four weeks, participants noted no significant change in symptoms. However, when the doses were escalated (up to six tablets twice a day) for six months, they experienced significant reductions in the severity of pain and tenderness.(5)

ME/CFS and Magnesium Deficiency

A 1991 case-control study found that 20 patients with ME/CFS had lower red cell magnesium concentrations than did 20 healthy matched control subjects. In the associated clinical trial, 32 ME/CFS patients received either placebo or intramuscular magnesium sulfate every week for six weeks.

The patients treated with magnesium reported having improved energy levels, a better emotional state, and less pain. Red cell magnesium returned to normal in all of the patients on supplemental magnesium, but in only one patient on placebo. The authors concluded that magnesium may have a role in ME/CFS.(6)

A number of leading ME/CFS specialists, including Daniel Peterson, MD, Jay Goldstein, MD, Jacob Teitelbaum, MD, Charles Lapp, MD, and Paul Cheney, MD, recommend a combination of malic acid and magnesium for muscle health and improved energy.

In his "From Fatigued to Fantastic" newsletter, Dr. Teitelbaum said, "Magnesium and malic acid are also critical. When malic acid and the other compounds are low, the body often has to shift to the very inefficient (anaerobic) means of generating energy. This contributes to the abnormal buildup of lactic acid that occurs after exercise in CFIDS/FM. This causes muscle achiness and fatigue."

How Much Magnesium/Malic Acid Should You Take?

Three of ProHealth's **Double Strength Ultra ATP+** tablets contain 125 mg of magnesium and 1200 mg of malic acid - a very effective balance based on years of patient experience. The recommended starting dose is three tablets taken an hour before breakfast and at bedtime. The dosage can be gradually increased as needed.

Dr. Sarah Myhill says, "Magnesium is extremely safe by mouth – too much simply causes diarrhoea. Try increasing the amount of magnesium you take by mouth until it causes diarrhoea, then reduce the dose slightly so it does not. This is called taking magnesium to bowel tolerance..."(7)

Some people taking magnesium and malic acid have noticed symptom improvement in as little as 48 hours; however, it may take as much as four to six weeks.

Summary

Magnesium and malic acid are essential nutrients, yet most people are deficient in them. Their pain relieving, energy producing and mood stabilizing qualities can be particularly beneficial for people with fibromyalgia and ME/CFS.

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