

Coenzyme Q10

Clinical trials consistently show that CoQ10 reduces fibromyalgia symptoms such as pain and fatigue.^{1,2,3,4}

Carnitine

Deficiency causes muscle pain due to inefficient cellular energy metabolism (mitochondrial myopathy) which presents as fibromyalgia.^{4,5}

Choline & Inositol

Altered levels of both nutrients seen in fibromyalgia; Choline & inositol are involved in pain perception.^{6,7,8,9}

Serine

Blood levels of this amino acid are much lower in fibromyalgia patients.^{10,11}

Vitamin D

Low levels impair neuromuscular function and cause muscle pain; Deficiency is common in fibromyalgia patients.^{12,13,14,15,16}

Vitamin B1

Thiamin (B1) deficiency mimics fibromyalgia symptoms including serotonin depletion (decreased pain threshold), a decrease in repair enzymes (muscle soreness) and poor energy production (muscle fatigue.)^{17,18}

Antioxidants

Low antioxidant status increases pain in fibromyalgia, which is often considered an oxidative stress disorder.^{19,20,21}

Selenium

Deficiency is linked to fibromyalgia; In one trial, symptoms improved in 95% of patients supplemented with selenium for at least 4 weeks.^{25,26,27}

Magnesium

Involved in pain perception pathways and muscle contraction; Treatment with magnesium can improve tenderness and pain.^{23,24,25}

Zinc

Blood levels of zinc are associated with a number of tender points in fibromyalgic patients.²²

FIBROMYALGIA

REFERENCES

- ¹Cordero M, Alcocer-Gomez E, de Miguel M et al. Coenzyme Q(10): A novel therapeutic approach for Fibromyalgia? Case series with 5 patients. *Mitochondrion* 2011;11:623-625.
- ²Lister R. An open, pilot study to evaluate the potential benefits of coenzyme Q10 combined with Ginkgo biloba extract in fibromyalgia syndrome. *J Int Med Res* 2002;30:195-199.
- ³Cordero M, Moreno-Fernandez A, Demiguel M et al. Coenzyme Q10 distribution in blood is altered in patients with Fibromyalgia. *Clin Biochem* 2009;42:732-735.
- ⁴Abdullah M, Vishwanath S, Elbalkhi A et al. Mitochondrial myopathy presenting as fibromyalgia: a case report. *J Med Case Rep* 2012;6:55.
- ⁵Rossini M, di Munno O, Valentini G et al. Double-blind, multicenter trial comparing acetyl L-carnitine with placebo in the treatment of fibromyalgia patients. *Clin Exp Rheumatol* 2007;25:182-188.
- ⁶Fayed N, Garcia-Campayo J, Magallón R et al. Localized 1H-NMR spectroscopy in patients with fibromyalgia: a controlled study of changes in cerebral glutamate/glutamine, inositol, choline, and N-acetylaspartate. *Arthritis Res Ther* 2010;12:R134.
- ⁷Wang S, Su D, Wang R et al. Antinociceptive effects of choline against acute and inflammatory pain. *Neuroscience* 2005;132:49-56.
- ⁸Petrou M, Harris R, Foerster B et al. Proton MR Spectroscopy in the Evaluation of Cerebral Metabolism in Patients With Fibromyalgia: Comparison With Healthy Controls and Correlation With Symptom Severity. *Am J Neuroradiol* 2008;29:913-918.
- ⁹Galeotti N, Bartolini A, Gherlardine C. Role of intracellular calcium in acute thermal pain perception. *Neuropharmacology* 2004;47:935-944.
- ¹⁰Yunus M, Dailey J, Aldag J et al. Plasma tryptophan and other amino acids in primary fibromyalgia: a controlled study. *J Rheumatol* 1992;19:90-94.
- ¹¹Koning T, Klomp L. Serine-deficiency syndromes. *Curr Opin Neurol* 2004;17:197-204.
- ¹²Turner M, Hooten W, Schmidt J et al. Prevalence and Clinical Correlates of Vitamin D Inadequacy among Patients with Chronic Pain. *Pain Med* 2008;9:979-984.
- ¹³Shinchuk L, Holick M. Vitamin D and rehabilitation: improving functional outcomes. *Nutr Clin Pract* 2007;22:297-304.
- ¹⁴Al-Allaf A, Mole P, Paterson C et al. Bone health in patients with fibromyalgia. *Rheumatology* 2003;42:1202-1206.
- ¹⁵Plotnikoff F, Quigley J. Prevalence of severe hypovitaminosis D in patients with persistent, nonspecific musculoskeletal pain. *Mayo Clin Proc* 2003;78:1463-1470.
- ¹⁶Mascarenthas R, Mobarhan S. Hypovitaminosis D-induced pain. *Nutr Rev* 2004;62:354-9.
- ¹⁷Eisinger J. Alcohol, thiamin and fibromyalgia. *J Am Coll Nutr* 1998;17:300-302.
- ¹⁸Koike H, Watanabe H, Inukai A et al. Myopathy in thiamine deficiency: analysis of a case. *J Neurol Sci* 2006;249:175-179.
- ¹⁹Altindag O, Celik H. Total antioxidant capacity and the severity of the pain in patients with fibromyalgia. *Redox Rep* 2006;11:131-135.
- ²⁰Ozgoçmen S, Ozyurt H, et al. Antioxidant status, lipid peroxidation and nitric oxide in fibromyalgia: etiologic and therapeutic concerns. *Rheumatol Int* 2006;26:598-603.
- ²¹Bagis S, Tamer L, Sahin G et al. Free radicals and antioxidants in primary fibromyalgia: an oxidative stress disorder? *Rheumatol Int* 2005;25:188-190.
- ²²Sendur OF, Tastaban E, Turan Y et al. The relationship between serum trace element levels and clinical parameters in patients with fibromyalgia. *Rheumatol Int* 2008;28:1117-1121.
- ²³Magaldi M, Moltoni L et al. Changes in intracellular calcium and magnesium ions in the physiopathology of the fibromyalgia syndrome. *Minerva Med* 2000;91:137-140.
- ²⁴Abraham G, Flechas J. Management of fibromyalgia: rationale for the use of magnesium and malic acid. *J Nutr Med* 1991;3:49-59.
- ²⁵Eisinger J, Plantamura A, Marie P et al. Selenium and magnesium status in fibromyalgia. *Magnes Res* 1994;7:285-288.
- ²⁶Chariot P, Bignani O. Skeletal muscle disorders associated with selenium deficiency in humans. *Muscle Nerve* 2003;27:662-668.
- ²⁷Reinhard P, Schweinsberg F, Wernet D et al. Selenium status in fibromyalgia. *Toxicol Lett* 1998;96-97:177-180.
- Additional references at <http://www.spectracell.com/online-library-mnt-fibromyalgia-abstract/>