

**Fibromyalgia:
Nutrition, Supplements and Other
Interventions**

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Conflict of Interest and Financial Disclosure

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None

**Fibromyalgia: Nutrition &
Supplements**

- Evidence based interventions
- Relative paucity of data

- Excessive anecdotal treatments

OVERVIEW

Fibromyalgia

- USA: estimated 10 million people
- approximately 3% to 6% of the world's population
- diagnostic criteria : 1990 American College of Rheumatology
- widespread pain above & below waist >6 months including the axial spine
- ≥ 11 of 18 well-defined tender points

Fibromyalgia

- prevalence of 2% to 3%
 - women 3.4% to 10.5% (c.f. 0.5% in men) (1)
- often under diagnosed and undertreated
- average 5 years to diagnosis (2)
- By the time of the diagnosis, the average fibromyalgia patient is incurring 25 visits and utilizing 11 prescriptions per year (3)
- (c.f. 12 visits and 4.5 prescriptions per year in controls as reported in a study in the United Kingdom)(3)
- 1. **Wolfe F, et al.** *Arthritis Rheum.* 1995
- 2. **Millea PJ, et al** *Am Fam Physician.* 2000
- 3. **Hughes G, et al** *Arthritis Rheum.* 2006

Fibromyalgia

- pathophysiology not completely understood.
- central sensitization with amplified pain perception
- external stressors, behavioral constructs, neurotransmitters, hormones, immune, and sympathetic nervous system involved
- neuroimmunoendocrine system has a role in the pathogenesis
 - multiple abnormalities demonstrated in peripheral and central nervous systems
- Bidirectional mechanisms involving peripheral nociceptive input as well as abnormal central pain processing

Neuroendocrine immunology of fibromyalgia: ANNALS OF THE NEW YORK ACADEMY OF SCIENCES. Vol. 1193 April 2010

Fibromyalgia

- Hypothalamic– pituitary–adrenal axis alterations
 - abnormal response to stress
- Recent data: role of cytokines in pathogenesis of FM
- autonomic nervous system implicated in maintenance of physiological homeostasis
 - sympathetic activity appears increased in FM
- Neuropeptide Y and receptors Y1 & Y2 have complex role in pain modulation.

Neuroendocrine immunology of fibromyalgia: ANNALS OF THE NEW YORK ACADEMY OF SCIENCES. Vol. 1193 April 2010

Complementary & Alternative Medicine

Evaluation of multiple studies

- methodological quality was moderate
- homeopathy studies were small, but each reported an improvement in pain
- anthocyanidins, capsaicin and S-adenosylmethionine each showed ≤ 1 statistically significant improved outcome compared with placebo
 - For anthocyanidins (sleep disturbance) and capsaicin (tenderness) single outcome improvement only despite several outcome measurements
- No evidence of efficacy was found regarding Soy in a single study

Conclusion: insufficient evidence on any CAM, taken orally or applied topically, for FM.

The small number of positive studies lack replication.

De Silva et al. *Rheumatology* 2010

Complementary & Alternative Medicine

- **Strong evidence:**
 - aerobic exercise and cognitive behavioral therapy.
- **Moderate evidence:**
 - massage, muscle strength training, acupuncture, and spa therapy
- **Limited evidence:**
 - spinal manipulation, movement / body awareness, vitamins, herbs, and dietary modification
- **Conclusions: Several non-pharmacologic treatments and manual-type therapies have acceptable evidentiary support in the treatment of fibromyalgia**

• J Manipulative Physiol Ther 2009

Complementary & Alternative Medicine

Review of evidence for herbal and nutritional supplements:

(e.g. St. John's wort, ginseng, valerian, botanical oil, melatonin, magnesium, DHEA, NADH, S-AMe, HGH, chlorella pyrenoidosa, 5-HTP, and several dietary supplements)

Many of these have shown promising results in early trials, but mixed results are increasingly common as the studies become methodologically more sophisticated.

Hassett A.L. Rheum Dis Clin N Am 35 (2009)

Sarac AJ, Gur A. Curr Pharm Des 2006

Complementary & Alternative Medicine

- 98% used some type of CAM therapy during previous 6 months
- 10 most frequently used CAM treatments:
 - exercise for a specific medical problem (48%)
 - spiritual healing (prayers) (45%)
 - massage therapy (44%)
 - chiropractic treatments (37%)
 - vitamin C (35%)
 - vitamin E (31%)
 - magnesium (29%)
 - vitamin B complex (25%)
 - green tea (24%)
 - weight-loss programs (20%)
- **CONCLUSION: CAM use is common in patients referred to a fibromyalgia treatment program**
 - Mayo Clin Proc. 2005;80(1):55-60

Fibromyalgia: Constellation Symptoms

- Pain
- Depression
- Anxiety
- Fatigue
- IBS
 - constipation
 - diarrhea
 - mixed
- Insomnia
- Cognitive impairment
- Medication Intolerance
- Headache
- Interstitial Cystitis
- Other connective tissue diseases

Supplements

Acetyl-L-Carnitine

Low levels (blood or muscles) of acetyl-L-carnitine in people with CFS / fibromyalgia

A.V.Plioplys, *Neuropsychobiology* 35 (1) (1997)
H. Kuratsune, *Clinical Infectious Disease* 18 (3 Supplement 1) (January 1994)

Acetyl-L-Carnitine

- 1000 mg ALCAR or placebo with 500 mg IM ALCAR or placebo (2 weeks)
- then 8 weeks 1500 mg ALCAR (PO) or placebo

- **Conclusion:**
... ALCAR may be of benefit in patients with FMS

- improvement in pain as well as the general and mental health of these patients.

• Rossini M Clin Exp Rheumatol, March 1, 2007

Acetyl-L-Carnitine

- Secondary carnitine deficiencies may occur due to certain disorders (such as chronic renal failure) or under particular conditions (e.g., use of certain antibiotics) that reduce carnitine absorption or increase its excretion
- well-tolerated and generally safe therapeutic agent
- acetyl-L-carnitine is better absorbed from the small intestine than L-carnitine and more efficiently crosses the blood-brain barrier

NIH Office of Dietary Supplements

“Myers’ Cocktail”

- **Design:** DBRPCT
- **Subjects:** 34 adults with ACR defined FMS.
- **Intervention:** weekly infusions of IVMT or placebo
 - Magnesium chloride hexahydrate 20% 2-5 ml, Calcium gluconate 10% 1-3 ml, Hydroxocobalamin 1,000 mcg/mL 1 mL, Pyridoxine hydrochloride 100 mg/mL 1 mL, Dexpanthenol 250 mg/mL 1 mL, B complex 100 1 mL, Vitamin C 222 mg/mL 4-20 mL
- **Outcome measures:** Tender Point Index, 8 & 12 weeks
- **Conclusions:** This first controlled pilot study established the safety and feasibility of treating FMS with IVMT.
- Most subjects experienced relief as compared to baseline, but no statistically significant differences were seen.
- Ather Ali, et al. Intravenous Micronutrient Therapy (Myers’ Cocktail) for Fibromyalgia: A Placebo-Controlled Pilot Study

Vitamin D -25-OH

non-specific musculoskeletal pain

Several studies have reported a "positive association" and two others found "no association."

Results: cutoff levels (< 30 ng/ml, < 20ng/ml and < 15 ng/ml).

No statistically significant differences were found between the groups regardless of the cutoff level used.

A logistic regression model for predicting women with 25OHD levels < 20 ng/ml showed that all the variables examined in both groups (age, country of birth, education) were not statistically significant.

We found the expected seasonal variations of 25OHD levels, though these were not statistically significant.

Conclusions: We found no association between fibromyalgia and low 25OHD levels as previously suggested in other studies.

IMAJ 2009;11:339-342

Vitamin D -25-OH

- FMP found to have high rates of vitamin D deficiency (evidence: 3b);
 - check levels with symptoms of FM (grade of rec: C).

- Risk factors
 - obesity
 - latitude north of 35 degrees (north of Atlanta and Los Angeles)
 - working indoors year round
 - advanced age
 - pigmented skin
 - sunblock use

Holick MF. Am J Clin Nutr 2004
Al-Allaf AW, et al. Rheumatology 2002

Capsaicin

- Applying cream containing 0.025% of the active capsicum constituent capsaicin 4 times daily to tender points for 4 weeks seems to reduce tenderness in patients with fibromyalgia

McCarty DJ, et al. Semin Arthr Rheum
1994

Malic Acid

- **alpha hydroxy acid**
- **used orally with magnesium hydroxide**
– (Super Malic tablets)
- **reduced pain and tenderness associated with fibromyalgia**

Russell IJ, et al. J Rheumatol 1995

Magnesium

- **Magnesium deficiency is common**
- **Taking magnesium hydroxide plus malic acid (Super Malic tablets) orally seems to decrease fibromyalgia-related pain and tenderness in some patients**

5-HTP

- **Taking 5-HTP orally appears to improve symptoms of primary fibromyalgia syndrome (PFS), including pain severity, morning stiffness, and sleeplessness**

Puttini PS, et al. J Int Med Res 1992
Nicolodi M, et al. Adv Exp Med Biol 1996
Caruso I, et al. J Int Med Res 1990

SAM-e

- **Taking SAME orally seems to improve fibromyalgia. Two clinical trials demonstrated significant improvement in symptoms of fibromyalgia compared to placebo**

**Tavoni A, et al. Am J Med 1987
Jacobsen S, et al. Scan J Rheumatol
1991**

Melatonin

- **Melatonin may decrease the severity of pain and the number of painful joints in people with fibromyalgia**

Citera G, et al. Clin Rheumatol 2000

- Recent studies have shown some evidence demonstrating that oxidative stress may have a role in the pathophysiology of FM.
- the role of mitochondria in the oxidant imbalance documented in FM controversial
- . Signs and symptoms associated with muscular alteration and mitochondrial dysfunction, including oxidative stress, have been observed in patients with FM.
- To this respect, Coenzyme Q10 (CoQ10) deficiency, an essential electron carrier in the mitochondrial respiratory chain and a strong antioxidant, alters mitochondria function and mitochondrial respiratory complexes organization and leading to increased ROS generation.
- Recently have been showed CoQ10 deficiency in blood mononuclear cells in FM patients, so if the hypothesis that mitochondrial dysfunction is the origin of oxidative stress in FM patients is demonstrated, could help to understand the complex pathophysiology of this disorder and may lead to development of new therapeutic strategies for prevention and treatment of this disease.
- Cordero MD; Miguel MD; Carmona-Lopez J; Bonal P; Campa F; Moreno-Fernandez AM Oxidative stress and mitochondrial dysfunction in Fibromyalgia. MINIREVIEW Neuro Endocrinol Lett. 2010 Apr 29;31(2):169-173.

Fibromyalgia: HPA axis dysfunction

Fibromyalgia: HPA axis dysfunction

- **CONCLUSION:** dysregulation of the HPA axis in FM
 - mild hypocortisolemia
 - hyperreactivity of pituitary ACTH release to CRH
- “We propose that a reduced containment of the stress-response system by corticosteroid hormones is associated with the symptoms of FM.”

J Rheumatol. 1998 Jul;25(7)

Fibromyalgia: HPA axis dysfunction

- **Salivary Cortisol Release and Hypothalamic Pituitary Adrenal Axis Feedback Sensitivity in Fibromyalgia Is Associated With Depression But Not With Pain.**
- Our results support the hypotheses that HPA axis related alterations are associated with affective disturbances (e.g.depression) in patients with fibromyalgia.
- **PERSPECTIVE:** The presented data suggest depression to be an important factor in HPA axis-related dysfunction in fibromyalgia.

Wingenfeld K., J Pain. 2010 Jun 1.

Fibromyalgia: HPA axis dysfunction

- **RESULTS:** Patients with fibromyalgia had significantly lower cortisol levels during the day, most pronounced in the morning.
- FM patients reported more pain, stress, sleeping problems, anxiety, and depression.
- **CONCLUSION:** The results lend support to the hypothesis of a dysfunction in the hypothalamus-pituitary-adrenal axis in FMS patients, with generally lower cortisol values, most pronounced upon awakening

Riva R Int J Behav Med. 2010 May 11

Fibromyalgia: HPA axis dysfunction

- **CONCLUSION:** Exaggerated NE responses and heart rate increases, as well as delayed ACTH release, were observed among female FM patients compared with age-matched female controls.
 - Delayed ACTH release after IL-6 administration in FM is consistent with a defect in hypothalamic CRH neuronal function
 - Exaggerated NE release may reflect abnormal regulation of the sympathetic nervous system, perhaps secondary to chronically deficient hypothalamic CRH
 - The excessive heart rate response after IL-6 injection in FM patients may be unrelated to the increase in NE, or it may reflect an alteration in the sensitivity of cardiac beta-adrenoceptors to NE
- These responses to a physiologic stressor support the notion that FM may represent a primary disorder of the stress system

Torpy DJ. Arthritis Rheum. 2000 Apr

Fibromyalgia: HPA axis dysfunction

- The results support the concept that the hormonal secretion pattern frequently observed in FM patients is primarily caused by CRH, possibly as a response to chronic pain and stress.
- The elevated levels of CRH in the circulation of FM patients suggest elevated levels of CRH-binding protein, which could explain why the levels of ACTH and cortisol between controls and FM following CRH do not differ.

- Riedel W Ann N Y Acad Sci. 2002 Jun;966:483-90 PMID: 12114308 [PubMed - indexed for MEDLINE]

Adaptogens

- **Panax Ginseng 400 mg**
- **Ashwagandha 400 mg**
- **Holy-basil 200mg**
- **Rhodiola 150mg**
- **Eleutherococcus 100mg**
- **Astragalus 100mg**

- **All of the above are anecdotal only**

Fibromyalgia: Constellation Symptoms

- **Pain**
- **Depression**
- **Fatigue**
- **IBS**
- **Cystitis**
- **Insomnia**
- **Cognitive impairment**
- **Intolerance to medication**
- **Headache**
- **Other connective tissue diseases**

Depression

- **SAM-e**
Bell KM, et al. Am J
Psychiatry 1988
- **Inositol**
Levine J, et al. Am J
Psychiatry 1995
- **5HTP**
Shaw K, et al. Cochrane
Database Syst Rev
2002
- **Folic acid (500 mcg –
10+ mg / day studies)**
Taylor MJ, et al.
Cochrane Database
Syst Rev 2003
- **Coppen A, et al. Arch
Gen Psychiatr 1972**

Fatigue

- **NADH**

Forsyth LM, et al. Ann Allergy Asthma Immunol 1999

- **Vitamin D3 / D2**

- **Magnesium**

Fatigue

- **D-Ribose**

- **5 grams three times daily might improve energy, sleep, and sense of well-being in patients with FM / chronic fatigue syndrome**

- Teitelbaum JE, et al. J Altern Complement Med 2006;12:857-62

Insomnia: Valerian

- **Valerian: reduces the time to sleep onset (sleep latency), and improves subjective sleep quality. The greatest benefit is usually seen in patients using 400-900 mg valerian extract up to 2 hours before bedtime**

- Donath F, et al. Pharmacopsych 2000
- Morin CM, et al. Sleep 2005

Insomnia: Melatonin

- **Extended release melatonin**
- **melatonin improves secondary insomnia related to depression**
- **subjectively improve secondary insomnia associated with various sleep-wake cycle disturbances**
 - Dolberg OT, et al. Am J Psychiatr 1998
 - Garfinkel D, et al. Lancet 1995
 - Haimov I, et al. Sleep 1995

Anxiety

- **passionflower extract 90 mg/day reduces symptoms of non-specific anxiety comparable to mexazolam**
 - Mori A, et al. Rinsho Hyoka (Clinical Evaluation) 1993
- **liquid extract 45 drops daily is comparable to oxazepam (Serax) 30 mg for treating symptoms of GAD in some patients**
 - Akhondzadeh S, et al. J Clin Pharm Ther 2001

Interstitial Cystitis

- **L-arginine 500-1500 mg /day**
 - Ehren I, et al. Urology 1998
 - Wheeler MA, et al. J Urol 1997
 - Korting GE, et al. J Urol 1999

IBS

- **Constipation:**
- **Diarrhea:**
- **Mixed**

IBS

- **food antibodies (IgG, IgA, and IgM) measured from jejunum of Rheumatoid Arthritis patients and healthy controls**
 - **all immunoglobulin classes showed increased food specific activities**
 - **Conclusions: production of cross reactive antibodies is increased in the gut of many RA patients**
- Hvatum M, et al. Gut, Sep 2006

IBS

- **About one-third of patients with suspected IBS had fructose intolerance**
- **symptoms improved on fructose-restricted diet despite moderate impact on lifestyle**
- **noncompliance was associated with persistent symptoms.**
- **High Fructose Corn Syrup may cause or exacerbate symptoms of IBS**

Rao S. Journal of Clinical Gastroenterology.
March 2008

IBS : Probiotics

- Suppression of growth or binding / invasion by pathogenic bacteria
- Improvement of intestinal barrier function
- Modulation of immune system
 - ↑ protective cytokines
 - ↓ proinflammatory cytokines
 - Saccharomyces boulardii limits migration of T-helper 1 cells
- Modulation of pain perception
- Some Lactobacillus strains induce expression of micro-opioid and cannabinoid receptors in intestinal epithelial cells and mediate analgesic functions in the gut in a manner similar to the effects of morphine

IBS: Melatonin

- relieved abdominal pain
- helps regulate sensations in the gut and the movement of food through the GI tract
- 3 mg of melatonin: significant reductions in abdominal pain, rectal pain, and the sensation of urgently needing to have a bowel movement
- did not have an effect on bloating, stool type or frequency, or anxiety or depression scores

GUT (Volume 54, page 1136)

IBS: Peppermint Oil

peppermint oil via enema to reduce symptoms of gastrointestinal spasm during barium enema

- 37 to 41 % receiving peppermint oil had non-spasm examination
 - (compared with 13.4% placebo)
- no residual spasm evident in 60% treated group
 - (compared with 35 % control group)

Asao T, et al. Clin Radiol 2003
Sparks MJ, et al. Br J Radiol 1995

IBS: Peppermint Oil

meta-analysis found statistically significant benefit of peppermint oil compared with placebo in the symptomatic treatment of IBS

Post meta-analysis adult trial:

- reduction in the severity of abdominal pain
- less abdominal distension
- reduced stool frequency
- less flatulence

Pittler MH, Ernst E. Am J Gastroenterol 1998

Headache

- Butterbur (standardized to 15% petasin and isopetasin) 75mg / BID
Lipton RB, et al. Neurology 2004
- CoQ10 100mg TID
Sandor PS , et al. Neurology 2005
- Feverfew
Murphy JJ , et al. Lancet 1988
Diener HC , et al. Cephalalgia 2005
- Magnesium
Peikert A , et al. Cephalalgia 1996
- Melatonin
Leone M , et al. Cephalalgia 1996
- Riboflavin(B2) 400mg / day
Schoenen J , et al. Neurology 1998
- Peppermint oil (topical)
Gobel H, et al. Cephalalgia 1994

Nutrition & Diet

Obesity

- 215 FMS patients: 47% obese and 30% overweight.
- Obesity:
 - greater pain sensitivity to TP palpation particularly in the lower body areas
 - reduced physical strength and lower-body flexibility
 - shorter sleep duration
 - greater restlessness during sleep
- obesity may aggravate fibromyalgia
- Consider weight management treatments
- Akiko Okifuji, J Pain. Relationship Between Fibromyalgia and Obesity in Pain, Function, Mood, and Sleep published online 10 June 2010 (accessed 7.02.10).

Diet & Nutrition

- Harvard Dept. Preventative Medicine
 - 244 women
- Strong, statistically significant association between glycemic load and plasma CRP
 - Independent of heart disease risks
- Conclusion: rapid intake of high glycemic load increases pro inflammatory mechanisms

Liu S, et al. *Amer J Nutr* 2002

Diet & Nutrition

33 patients w/ FM: 3 months vegan diet

Vegan diet: Improved pain scores
Decreased joint stiffness
Improved sleep

Kaartinen K, et al. *Scan J Rheum* 2000

- Meta analysis:
- fasting followed by vegan diet in RA
- Statistically significant and long term clinical benefit

Diet & Nutrition

- Neither Mediterranean diet nor fasting treatments affect the microbiologically assessed intestinal flora and sIgA levels in patients with RA and FM.
- The impact of dietary interventions on the human intestinal flora and the role of the fecal flora in rheumatic diseases have to be clarified with newer molecular analysis techniques.
- The potential benefit of fasting treatment in RA and FM should be further tested in randomized trials.
 - BMC Complement Altern Med. 2005 Dec22.

Diet & Nutrition

- Conclusion: vegan diet changes the faecal microbial flora in RA patients, and changes in the faecal flora are associated with improvement in RA activity.
 - Poltenen, Br J Rheumatol. 1997

Diet & Nutrition

- DBRPCT
- daily soy or placebo (casein) shake.
- total FIQ scores decreased by 14% in the soy group and by 18% in the placebo group.
 - difference was not significant ($P = 0.16$).
- Shakes that contain soy and shakes that contain casein, when combined with a multidisciplinary fibromyalgia treatment program, provide a decrease in fibromyalgia symptoms.
- Separation between the effects of soy and casein (control) shakes did not favor the intervention

Diet & Nutrition

- **Food sensitivities can be IgE, IgG, IgA, IgM**
 - May not involve Ab
- **Patient commitment**
- **Eliminate all known triggers 2-4 weeks**
 - Brown rice, vegetables, legumes, non-citrus fruits, fish
- **Monitor symptoms**
 - Improvements indicates likely sensitivities
- **If no improvements (4 weeks) can likely r/o sensitivities**

Hedges HH: *Elimination Diet as Diagnostic Tool.*
Am Fam Phys 46(Sup) 1992

Dietary Summation

- increase O3FA
 - flax seed, fish oils, leafy green vegetables, walnuts, soy, algae
- Grass fed beef
 - cold-water fish
 - mackerel, salmon, kipper, sardines, white chunk tuna
- Decrease O6FA
- olive oil & canola oil
- Low saturated fats / high monounsaturated
- additional fats should come from nuts and seeds
- fruits and vegetables
- Pre & pro biotics
- low glycemic index foods
- Whole grains
- High fiber
- High non-animal source protein
- Drink teas
- Coffee & Alcohol in moderation
- Avoid artificial sweeteners
- organics
- whole foods
- Mediterranean-style diet / Japanese style-diet

Other Treatments

CBT

- **Conclusion.** The presented results demonstrate for the first time that tailored CBT and exercise training for high-risk FM patients is effective in improving short- and long-term physical and psychological functioning, indicating that tailoring treatment is likely to promote beneficial outcomes in FM and reduce the burden for patients and society.

van Kouil S, et al. *Arthritis Care & Research* DOI10.1002/acr.20268

IBS: Cognitive Behavior Therapy

- (1) routine clinical care, (2) relaxation training, (3) CBT
- similar improvement among groups
- no difference in degree of improvement
- **Bottom Line:** There is no good evidence that cognitive behavior therapy or relaxation therapy is any more helpful than usual treatment in patients with IBS

IBS: Hypnotherapy

- published evidence suggests hypnotherapy is effective in management of IBS
- 10 of 18 studies indicated significant benefit

Homoeopathy

Four RCTs were found, including two feasibility studies.

Three studies were placebo-controlled.

None of the trials was without serious flaws.

Invariably, their results suggested that homoeopathy was better than the control interventions in alleviating the symptoms of FM.

Independent replications are missing.

Even though all RCTs suggested results that favor homoeopathy, important caveats exist.

Therefore, the effectiveness of homoeopathy as a symptomatic treatment for FM remains unproven.

Perry R Clin Rheumatol. 2010 May

IBS: Acupuncture

- **IBS: Medline-cited literature up to May 2006**
- **In all trials, quality of life (QOL) improved significantly independently from the kind of acupuncture**
- **Real AC was significantly superior... with regard to disease activity scores**
- **Schneider A, et al. World J Gastroenterol. 2007 Jul 7;13(25):3417-24.**

Acupuncture

- 7 RCTs / 385 patients were included
 - Strong evidence for reduction of pain at post-treatment
 - no evidence for the reduction of fatigue and sleep disturbances, or the improvement of physical function at post-treatment.
 - no evidence for the reduction of pain and improvement of physical function at the latest follow-up (26 weeks)
 - Subgroup analyses resulted in moderate evidence for a significant and small reduction of pain at post-treatment in studies with electro-stimulation and individualized acupuncture
 - Significant reduction of pain only present in studies with bias risk
 - Side effects were inconsistently reported
- Langhorst J, et al. Rheumatology (Oxford). 2010 Apr

Acupuncture

- **50 patients ACR criteria for fibromyalgia**
 - had tried conservative symptomatic treatments other than acupuncture.
- **CONCLUSION: We found that acupuncture significantly improved symptoms of fibromyalgia. Symptomatic improvement was not restricted to pain relief and was most significant for fatigue and anxiety.**
- *Dept of Anesthesiology and Department of Health Sciences Research, Mayo Clinic College of Medicine; and Division of Psychology and Department of Pain Medicine, Mayo Clinic College of Medicine.*

Exercise

- moderate evidence for reduction of pain and improved health-related quality of life (HRQOL) at the end of therapy.
- moderate evidence that the reduction of pain and improvement of HRQOL could be maintained at follow-up (median 14 weeks).
- **CONCLUSIONS:** An aerobic exercise program for FM patients should consist of land-based or water-based exercises with slight to moderate intensity two or three times per week for at least 4 weeks.
- The patient should be motivated to continue exercise after participating in an exercise program.
- Häuser W, Arthritis Res Ther. 2010 May

Multi Component Treatment

- **CONCLUSIONS:** There is strong evidence that multi component treatment has beneficial short-term effects on the key symptoms of FM.
- Strategies to maintain the benefits of multi-component treatment in the long term need to be developed.
Häuser W, Arthritis Rheum. 2009 Feb

CONCLUSIONS

THANK YOU
