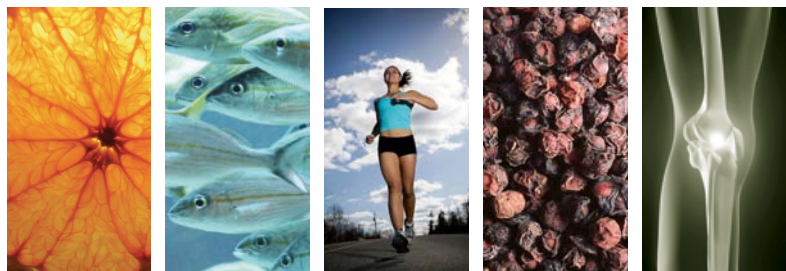


sports nutrition



Sports Nutrition - Not Only for Athletes. Many athletes face both symptoms of exercise over-training and under-recovery, which may be alleviated with proper nutrition and supplementation. However, supplementation is not only for athletes and body builders. While the average person attending a gym or playing a recreational sport may not suffer from over-training and under-recovery, they may experience muscle straining and increased injury due to poor training routines, lack of stretching or under-training.

The initial step is to address training routines to make them safer and more effective. Unless you have specific qualifications in designing programs, the implementation of specific training may best be left to a sports coach or personal trainer. As natural medicine practitioners, we can however provide general exercise information, especially regarding walking and running exercises. For further information see the new Nutrmedicine exercise log book, which contains handy hints for safe exercise programs.

The second step is to examine diet and other lifestyle issues of the patient. It is not uncommon to see men working hard at the gym without giving their diet a second thought except perhaps for taking an amino acid supplement post-training to repair muscle damage. Overweight men are often at a loss as to why they do not lose weight or shape-up significantly from resistance/weight training. Particular emphasis needs to be placed on achieving a balanced diet according to training levels.

The third step is to assess the usefulness of supplementation. Clinical trials have generally produced mixed results, which may be due to a variety of issues including quality of the trial design, dosage, duration and product, but reliable quality supplementation may be used to enhance performance or to reduce the risk of injury and long-term damage.

Find the Energy

It is not always easy to find the energy, or motivation to exercise, especially after spending the day working or looking after young children. A herbal mix of adrenal tonics (adaptogens) may just make the difference, by reducing stress levels and increasing energy. Consider Korean Ginseng for a stronger stimulation; and Siberian Ginseng, Rhodiola or Withania as less stimulating adaptogens. A study found that extract equivalent to 400 mg of Korean Ginseng root for four weeks significantly improved fatigue. Side-effects were uncommon with only two subjects withdrawing from the study.¹ Nervines including St John's Wort, Oats and Skullcap may also be beneficial. While exercise is great for stress reduction, feeling stressed and anxious may reduce our desire to exercise. A multivitamin

and mineral formulation containing all the B vitamins, selenium and alpha-lipoic acid for their antioxidant effects should be considered in order to maintain wellbeing and promote good health.

In recent years, Coenzyme Q10 has gained considerable attention as a nutritional supplement capable of influencing cellular bioenergetics and counteracting free radical damage. CoQ10 improves energy (adenosine triphosphate - ATP) production in the mitochondria, acts as an essential antioxidant and supports the regeneration of other antioxidants, improves the stability, fluidity and permeability of membranes and stimulates cell growth and inhibits cell death.²

In athletes, CoQ10 deficiency may produce metabolic stress and free radical formation during times of intense training. Some studies have found CoQ10 to improve exercise performance and recovery, while others have been negative. It is possible that these inconsistent findings are due to the poor bioavailability of CoQ10 from particular supplements. CoQ10 is a large, hydrophobic molecule, which therefore limits its absorption and muscle tissue uptake. Various manufacturing techniques have been developed to improve the absorption of CoQ10 and a recent pilot study found that an enhanced form of CoQ10 resulted in higher muscle CoQ10 concentration, lower serum SOD (a marker of cellular antioxidant damage) and higher MDA (a marker of lipid peroxidation) levels during and following exercise. Two week supplementation also tended to increase time to exhaustion.² The normal dosage of CoQ10 may be as high as 150 mg daily due to its poor bioavailability, however, when using a product with enhanced bioavailability, such as the micellised form, results may be achieved with a 50 - 100 mg daily dose.

Reduce the Oxidating Effects of Intense Exercise

Exercise training is known to increase free radical production, which potentially leads to muscle injury. Athletes can use ten times the amount of oxygen during activity, so oxidative stress on their cells is enormous. Vitamins C and E are well known antioxidants that may

assist in the prevention of muscle cell damage. A pilot study found that vitamin C and E supplementation in soccer players reduced lipid peroxidation and muscle damage during high intensity efforts ($p < 0.05$). The study also found that the vitamins did not enhance actual performance.³ For best antioxidant results, consider a combination of flavonoids and vitamin C. Studies have shown that antioxidants should never be used in isolation and specific antioxidants including vitamins A, C and E, selenium, CoQ10 and alpha-lipoic acid are best prescribed in combination. Potent herbal antioxidants include Grape Seed, Milk Thistle, Green Tea, Turmeric and lycopene.

Reduce Inflammation and Muscle Ache, Protect Joints and Bones

Both over-training and misguided exercise undertaken by an unfit person may result in acute or chronic inflammation. Over-training, poor training and injury further result in arthritic changes.

Several studies have reported that the intake of fish oils is inversely associated with serum C-reactive protein concentrations. C-reactive protein is a marker of acute inflammation. A recent study involving 971 elderly Japanese men and women found that a greater intake of fish oils was related to a reduced prevalence of high CRP concentrations. These findings suggest that even very high intakes of omega 3 fatty acid may lower serum CRP concentrations and reduce inflammation.⁴ Fish oils (3.2 g EPA and 2.2 g DHA) have also been shown to reduce exercise-induced bronchoconstriction and inflammation in athletes.⁵

Other anti-inflammatory compounds include herbs such as Boswellia, Devil's Claw, Turmeric and Willow Bark. Nutrients for joint support include glucosamine, chondroitin sulphate, bromelain, rutin, and the minerals; silica, manganese and zinc. Products containing these ingredients can be given prophylactically as well as therapeutically.

The build-up of lactic acid is experienced by all who exercise and it causes pain and weakness in muscles. Muscular acidosis can be reduced by taking sodium bicarbonate (baking soda) or citrate (citric acid). Athletes may use pre-event loading with sodium bicarbonate and citrate to reduce the lactic acid build up. It is also possible to reduce muscular acidosis by adding 100 g baking soda to a warm bath. Epsom salts (magnesium sulfate) are also beneficial for muscle relaxation and detoxification by adding two cups to a warm bath. You can buy Epsom salts in bulk from your local pharmacy or supermarket. A diet high in fruits and vegetables and low in animal proteins will also help the body become less acidic. A good magnesium powder containing the appropriate cofactors is one of the best remedies for alleviating cramps and muscle aches.

Improve the Omega 6 to Omega 3 Ratio

Humans evolved consuming a diet containing approximately equal amounts of omega 6 and omega 3 essential fatty acids. In Western diets today, the ratio of omega 6 to omega 3 fatty acids ranges from approximately 10:1 to 20:1 instead of the traditional range of 1:1 to 2:1. Studies indicate that a high intake of omega 6 fatty acids shifts the physiological state to one that is prothrombotic and proaggregatory, characterised by increases in blood viscosity, vasospasm and vasoconstriction, and decreases in bleeding time. Omega 3 fatty acids, however, have anti-inflammatory, antithrombotic, antiarrhythmic, hypolipidaemic, and vasodilatory properties. Excessive free radical formation and trauma during high-intensity exercise leads to an inflammatory state that is made worse by the increased amount of omega 6 fatty acids in Western diets. Luckily, this can be counteracted by eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) found in omega 3. Anybody who is exercising may benefit from taking 1 - 2 g/day at a ratio of EPA:DHA of 2:1.⁶ This is around 800 - 1200 mg EPA and 400 - 600 mg DHA.

Fish Oils and Bone Mass Density

Fish oils, especially DHA, are also important for maintaining good Bone Mass Density (BMD). A study of 78 healthy young men found a positive correlation between omega 3 fatty acid concentrations and changes in BMD at the spine ($p = 0.02$). An even stronger correlation was found for DHA. Concentrations of DHA were positively associated with total BMD ($p = 0.004$) and BMD of the spine ($p = 0.008$).⁷

Improve Performance and Endurance

Athletes, especially body builders, are often looking for supplements which may enhance their athletic performance and endurance. These products are known as ergogenic aids and include creatine, HMB (beta-hydroxy-beta-methylbutyrate) and the hormones DHEA and androstenedione.

Creatine:

- Promotes the production of lean muscle mass and enhances athletic performance in sporting events encompassing explosive bursts of power.
- Principally acts by increasing the availability of ATP to muscles during exhaustive exercise. Prolonged activity stimulates further muscle development.
- Increases the muscle fluid content which may stimulate further protein synthesis in muscles.
- May also help buffer muscle acidity, improve insulin-sensitivity and reduce free radical damage
- Creatine monohydrate is considered the most effective and safe nutritional supplement available in terms of increasing high-intensity exercise capacity and lean body mass during training.

Adaptogens and tonics including Korean Ginseng, Withania and Schizandra can be used to improve stamina and endurance and reduce recovery time. In a randomised, double-blind, cross-over study, 18 healthy horses received a single dose of Schizandra concentrate (equivalent to 50 g of dried berries, standardised to

contain 1.2% schisandrins) or placebo 30 minutes before a test race. For the race horses, the exercise consisted of an eight minute race over 5.6 km. The show-jump horses were taken over a 700 m obstacle course with 12 jumps. Treatment with Schizandra reduced heart rate and respiratory frequency, increased plasma glucose and decreased lactate levels in both exercise groups, although the effects were more marked in the race horse group. The Schizandra-treated show-jump horses completed the circuit in a shorter time than the controls. It was thought that Schizandra may cause a lower synthesis of lactate in muscles under anaerobic conditions and stimulate lactate clearance by the liver.⁸ Now you may not feel like running or jumping like a horse, but Schizandra may just give you or your patients a helping hand.

Korean Ginseng in combination with nutrients has been shown to improve exercise performance. Exercise performance was assessed on a treadmill according to the seven steps Bruce protocol. Physiological parameters were assessed before and after each step; and three, six and nine minutes after the end of the exercise. Maximal oxygen consumption, plasma lactate level, CO₂ production, ventilation, and heart rate all significantly improved after Korean Ginseng, while no change was observed after placebo.⁹

Protein Powders

Consuming proteins and low GI carbohydrates pre- and post exercise promotes muscle gain. A low GI carbohydrate and sugar free diet is essential for maintaining a healthy body weight, however it is all about balance. Individuals who engage in regular exercise training need more protein than sedentary people. While it is possible for physically active individuals to obtain their daily protein requirements through a varied diet, supplemental protein in various forms including whey, is a practical way of ensuring adequate and quality protein intake for athletes. When part of a balanced, nutrient-dense diet, protein intakes at this level are not detrimental to kidney function or bone metabolism in healthy, active people. Specific amino acid supplements, such as branched-chain amino acids (leucine, isoleucine and valine), may improve exercise performance and recovery from exercise.

Lose Weight and Tone Up

Exercise and proper diet is essential to safe weight reduction. To lose fat a person needs to create a kilojoule deficit. However we often 'reward' ourselves after exercise in the gym with a large meal or a visit to the pub, which negates fat loss. The other extreme is also counterproductive. Severe kilojoule restriction is not as efficient as a moderate kilojoule restriction combined with a regular exercise program. It is important to make exercise fun and enjoyable, plus remember to fuel the body with enough kilojoules to provide energy to exercise. Eating a small breakfast and a big dinner tends to be fattening, whereas eating a substantial breakfast and lunch can help reduce fat gain. Adoption of a low-fat, vegan diet has been shown to be associated with a significant weight loss and increased insulin sensitivity in overweight menopausal women over a 14 week period.¹⁰ Herbs and nutrients to support weight loss include Coleus (may increase metabolism and promote lean body mass), Gymnema

sports nutrition

CLINICAL INFORMATION

(may stabilise blood sugar) and omega 3 (promotes weight loss). Avoid supplements with added sugars, especially fructose. Avoid soft drinks and fruit juices. Filtered water is more than adequate for most people during and after normal exercise. Almonds and other nuts are a good snack food as regular consumption of nuts may help to regulate body weight by suppressing appetite and fat absorption.¹¹

Conclusion

Everyone should exercise, whether it is walking, cycling, jogging, yoga or playing sports, to name a few. As natural health practitioners we can support patients embarking on a regular exercise program. We can encourage exercise, assist in the development of an exercise program, improve motivation and self-esteem, and increase energy levels, while reducing any acute or chronic deleterious effects from exercise.

Supplement	Daily Dosage
Magnesium (powder formulation with cofactors)	300 mg
CoQ10 (micellised form)	50 mg
Vitamin C with flavonoids	2 - 5 g
Multivitamin and mineral formulation with antioxidants, including selenium and alpha-lipoic acid	1 - 2 tablets
Antioxidant (mixed nutritional and herbal antioxidant)	1 - 3 tablets
Glucosamine (powder formulation with cofactors)	1,500 mg
Omega 3 fish oils	1 - 2 g

References

- 1 Le Gal M, Cathebras K. *Phytother Res* 1996; 10: 49-53
- 2 Cooke M, Iosia M et al. *J Int Soc Sports Nutr* 2008; 5: 8
- 3 Zoppi CC, Hohl R et al. *Journal Int Soc Sports Nutr* 2006; 3(2): 3-44
- 4 Niu K, Hozawa A et al. *Am J Clin Nutr* 2006; 84(1): 223-229
- 5 Mickleborough TD, Murray RL et al. *Am J Respir Crit Care Med* 2003; 168(10): 1181-1189
- 6 Simopoulos AP. *Curr Sports Med Rep* 2007; 6(4): 230-236
- 7 Högström M, Nordström P et al. *Am J Clin Nutr* 2007; 85(3): 647-648
- 8 Ahumada F, Hermosilla J et al. *Phytotherapy Research* 1989; 3(5): 175-179
- 9 Pieralisi G, Ripari P et al. *Clin Ther* 1991; 13(3): 373-382
- 10 Barnard ND, Scialli AR et al. *Am J Med* 2005; 118(9): 991-997
- 11 Coates AM, Howe PR. *Curr Opin Lipidol* 2007; 18(1): 25-30

