Standard Process

Nutritional Support Protocol

Support for Exercise Endurance

Developed and reviewed by the clinical, chiropractic, and naturopathic members of the Standard Process team

Physiology of Exercise Endurance

Exercise endurance depends on the body's ability to efficiently produce and sustain energy over time. Oxygen uptake and utilization are critical, with VO_2max — the maximum rate of oxygen consumption during exercise — serving as a key marker of cardiovascular fitness and a predictor of health span and longevity.

Endurance training induces physiological adaptations that enhance energy production and oxygen delivery. These include increased stroke volume, improved blood flow, and greater capillary density in muscle tissue, which supports oxygen diffusion, nutrient delivery, and waste removal.

Sustained endurance activity relies on continuous adenosine triphosphate (ATP) production through oxidative phosphorylation in muscle mitochondria. This aerobic process, fueled by carbohydrates and fats, is slow but efficient. In contrast, anaerobic metabolism produces ATP quickly during high-intensity or oxygen-limited efforts, but generates lactate and hydrogen ions, contributing to muscle fatigue.

Training increases mitochondrial enzyme activity, enhancing fat oxidation and reducing lactate buildup, thereby improving VO_2max and endurance. Fatigue near VO_2max can result from glycogen depletion, dehydration, and electrolyte loss — all of which impair muscle function and oxygen use. Nutritional interventions and lifestyle strategies that support energy metabolism, oxygen efficiency, and muscle resilience can improve endurance performance.

Supportive Lifestyle Practices

- Encourage sauna use following exercise to support endurance. Thermal therapy elevates heart rate, promotes sweating, and may enhance VO_2max. One study found that 15-minute sauna sessions, three times per week after exercise, improved VO_2max more than exercise alone over 8 weeks.[1]
- Recommend incorporating high-intensity interval training (HIIT) to increase VO_2max. HIIT alternates intense effort, characterized as greater than 90% VO_2max or 75% max power, with recovery periods. This combination of aerobic and anaerobic training has been found to improve VO_2max through cardiovascular adaptation.[2]

Whole Foods Nutritional Recommendations

- Recommend foods rich in Coenzyme Q10 (CoQ10) to support energy production and preserve muscle health. CoQ10 supports mitochondrial function and has been shown to reduce markers of muscle damage when increasing load and repetitions.[3] CoQ10 is found in organ meats, beef, chicken, and fatty fish.
- The consumption of nitrate-rich foods like beets can support exercise performance. Dietary nitrates convert to nitric oxide, which enhances blood flow and oxygen delivery to muscles. Clinical studies show that beetroot juice improves cardiorespiratory performance and delays fatigue during exercise.[4]
- Encourage patients to consume magnesium-rich foods like Swiss chard and buckwheat to support cellular energy production, muscle function, and exercise recovery. Magnesium promotes mitochondrial efficiency and regulates calcium levels in muscle cells for proper contraction and relaxation. Magnesium has been found to support exercise performance, modulate soreness, and enhance recovery after exercise.[5]
- B vitamins support exercise endurance by fueling energy production and enhancing oxygen delivery. They act as coenzymes in the metabolism of carbohydrates, fats, and proteins, and several B vitamins support mitochondrial function and red blood cell synthesis. In a randomized, double-blind trial, 28 days of supplementation with B1, B6, and B12 supported improved exercise endurance and modulated post-exercise fatigue.[6]

Dietary Supplement Regimen

SP® Red Food

Suggested Use: **3 capsules per day**

SP® Red Food provides phytonutrients from organic whole red beetroots and organic mountain spinach (Atriplex hortensis) grown on the Standard Process certified organic farm, along with astaxanthin from whole algae. Together, they support muscle, metabolic, and cardiovascular health across a range of ages and activity levels.*

- Supports healthy blood flow and blood vessel function*
- Helps improve endurance exercise performance*
- Promotes muscle recovery post-exercise*
- Supports muscle health and mobility in combination with exercise*

Magnesium Lactate

Suggested Use: **2 tablets per day**

Magnesium Lactate contains magnesium to promote cellular energy production.*

- Promotes cellular energy production*
- Helps facilitate muscle contraction*
- Supports the body's energy production, which is used by the central nervous system, neuromuscular, and cardiovascular systems*

B Vitality with CoQ10

Suggested Use: **3 capsules per day**

B Vitality with CoQ10, is a cellular health supplement containing coenzyme Q10 (CoQ10) to help protect cells from free radicals.*

- Supports the whole body, with emphasis on cellular processes*
- Provides nutrients that support antioxidant activity*
- Includes the enzyme bromelain from pineapple stems and juice that modulates pathways involved in the body's natural inflammatory response function*
- Contains coenzyme Q10, a nutrient that is essential for generation of energy within the mitochondria of cells and that helps protect cells from free radicals*

Eleuthero

Suggested Use: **1 tablet 2-4 times daily**

Eleuthero contains Eleutherococcus senticosus root, which has been traditionally used to help the body adapt to temporary stress and support physical and mental endurance.* The phytochemicals in Eleuthero root have been used traditionally to:

- Enhance the body's natural ability to adapt to temporary stress*
- Support physical and mental endurance*
- Promote vitality*
- Restore and support healthy immune system function*

Assessment of Exercise Endurance

In Office/Physical Exam

- **Field Tests:** 6-Minute Walk Test, Cooper 12-Minute Run Test, Harvard or YMCA Step Test
- **Heart Rate Recovery:** Measure peak heart rate at the end of exercise and again after 1 minute. A drop of at least 18 beats per minute is considered favorable.
- **Direct VO_2max testing:** Most accurate, but limited to specialized settings.
- **Lab Studies:** Iron panel with ferritin, complete blood count

REFERENCES

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4. Domínguez. R. et al. (2017). Nutrients. 9(1):43.
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6. Lee. M. (2023) Int J Med Sci. 20(10):1272-1281.

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*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.