

What is Nervous System Fatigue and How do I Prevent it?

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Nervous system fatigue can be grouped into 2 categories, peripheral and central.

Central nervous system (CNS) fatigue is neural fatigue originating in the brain, brain stem, spinal cord, or spinal nerves. The exact mechanism for CNS fatigue remains largely unknown but it appears that acute CNS fatigue may occur as a result of decreased reflex sensitivity and / or less than optimal output from the motor cortex. Chronic CNS fatigue on the other hand is likely caused by increased inhibitory drive to the alpha motor neurons. Motivation and emotional state have also been linked to both acute and chronic CNS fatigue, but it is not known if this is a cause or effect relationship.

The demand that is placed on the CNS is a product of both the volume and intensity of training. CNS fatigue can be brought on by doing a high volume of low intensity training or by comparison a low volume of high intensity training. Insufficient balancing of work and rest periods coupled with overambitious training will likely lead to CNS fatigue. The best way to think of the effect various activities have on the CNS may be to put them on a continuum. The more intense something is (as a % of maximal effort / speed), the lower the volume that can be done until the CNS becomes fatigued.

Unlike CNS fatigue, peripheral nervous system (PNS) fatigue is localized to a given body site. For example, when running the 100m, PNS fatigue is likely to occur in the knee and hip extensor muscle groups. There are several possible mechanisms for PNS fatigue, ranging from the accumulation of inorganic Phosphate and H⁺, to the failure of the sarcoplasmic reticulum to release sufficient Ca⁺⁺ due to signaling problems from the T-tubules, to insufficient manufacture and release of Ach at the neuromuscular junction. Unlike in the case of CNS fatigue, all of these mechanisms are acute and should not produce long lasting fatigue.