

## Causes and Treatment of Delayed Onset Muscle Soreness

Delayed onset muscle soreness (DOMS) is a familiar experience for the elite athlete and the average fitness participant. DOMS can range from muscle tenderness to severe debilitating pain. It usually occurs 24-48 hours after an intense workout, especially one involving eccentric or plyometric work.

Despite the fact that DOMS is a common phenomena, the physiological mechanisms, treatment strategies and impact on physical performance remain uncertain. DOMS is often seen when athletes and exercisers return to training following a period of reduced activity or rest, such as between seasons or after an injury. DOMS is also common when individuals are exposed to new movement patterns or sudden increases in intensity and/or duration.

Eccentric activity (lengthening of the muscle upon contraction) induces micro-tears and injury at a greater rate and severity than other types of muscle actions. This is because a muscle is stronger eccentrically than concentrically and capable of producing more stress. A concentric contraction (muscle contracts while shortening) is not as strong as an eccentric contraction and is less likely to cause DOMS due to micro-tears and trauma.

Research has come up with several theories on why DOMS occurs. They include accumulation of lactic acid, drop in acidity or Ph, connective tissue damage, muscle damage, inflammation, and enzyme efflux. It is most likely that a combination of 2-3 of these physical phenomena work together to create DOMS.

DOMS can reduce exercise performance by causing a reduction in the joint's range of motion and peak torque. DOMS also causes detrimental changes in the sequence of how the various muscles and their fibers fire and how they are recruited by putting unnecessary stress on ligaments and tendons.

If an athlete has DOMS, a premature return to normal intensity training could increase DOMS and increase the risk of an injury. Several treatment strategies have been introduced to relieve the severe soreness and allow a quick return to maximal work performance. Here are some of the therapies which have been utilized and studied. Not all have proven successful:

- \*Nonsteroidal anti-inflammatory drugs have shown to have dose dependent effects.
- \*Studies on massage have had varying results. The timing and type of massage can determine whether or not it is therapeutic.
- \*Cryotherapy has not been shown to be effective
- \* The popular method of stretching has not held up as a means to relieve DOMS
- \*Ultrasound and electrical modalities have not panned out as a treatment for DOMS
- \*Appropriate type and intensity of exercise is the best treatment for DOMS. Continue to exercise at a lower intensity, avoid eccentric contractions and don't try unfamiliar movement patterns.
- \* To help avoid and lessen DOMS throughout a season, add eccentric and new moves after a base conditioning level has been achieved.

DOMS is still of interest to the sports science world and there are still many unanswered questions relating to DOMS, what causes it and how best to treat it. The best current treatment advice is to continue exercising while choosing familiar moves at a lower intensity, avoiding eccentric contractions until the pain subsides. Anti-inflammatory drugs and massage may also be helpful.

### About the Author

Dr. Lanny Schaffer is an Exercise Physiologist and the President of the International Fitness Academy. For more cutting edge training information go to <http://www.aerobic-exercise-coach.com>

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