



## Delayed Onset Muscle Soreness (DOMS)

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### About now is when we start thinking about getting fit for Summer!

An approaching Summer often provides motivation, new products and programs to once again commit to health and fitness. While motivation always fluctuates, all too often new training regimes are unavoidably impacted when we are struck down by injury, stiffness or aching muscles and joints resulting in a loss of consistency, focus and drive. This year can be different. Even if you have already fallen off the proverbial wagon, there is hope!

### Delayed Onset Muscle Soreness (DOMS)

A question I am frequently asked is “how do I recover from my intense workouts?” I like this question because you do not need to be a fitness model or bodybuilder to ask it. Intensity is relative. When we exceed our body’s capacity for exercise, we experience discomfort, the most common of which is Delayed Onset Muscle Soreness which naturally holds the acronym DOMS ☺. DOMS has developed into one of those conditions for which new theories continue to develop not to mention a lot of folklore. So to get as comprehensive solution as possible I spoke to some expert trainers, delved into the literature and hit the gym myself to answer this question.

DOMS usually develops 12-48 hours after intensive and/or unusual eccentric muscle action such as walking down a hill or lowering weights. Most of us know when we train hard (intensively) that we will be sore, but “unusual eccentric muscle action” also explains why doing a completely new exercise, even on very low weights, can also result in soreness the next day. It is also important to highlight that DOMS result from the “eccentric muscle action” which is the opposite phase to what we would expect eg it is when we lower ourselves in a push up, or lower ourselves in a squat, or lower the bar in a bicep curl versus the concentric phase such as pushing up in a push up. That is why it is walking down hill that results in DOMS, not walking up as most of us would naturally assume!

Everything hurts during DOMS. The muscles are sensitive to touch, exercise, and even passive stretch. The reason behind this pain is that when you train a whole plethora of things happen in your body from increased lactic acid that the body needs to expel, muscle spasms or cramps, a lot of inflammation and small tears (microtrauma) in both connective tissue (ligaments) and muscle.

Even though unpleasant, DOMS should not be considered as an indicator of muscle damage, rather a sign of the healing process, which is well known to contribute to increased muscle mass. This is a good thing! However, it is not uncommon to lose some range of motion as well as perceived strength during the post training DOMS period. Here is the tricky part and the missing piece of the puzzle for which most people are completely unaware. Muscle soreness disappears 2-10 days before complete functional recovery, and during this painless period is when true joint or muscle injuries can occur because<sup>1</sup> you train a muscle that hasn’t fully recovered, more commonly referred to as over training. So what are the different solutions to DOMS?

### Traditional Medical Treatments for DOMS

Commonly used physical medicine modalities, such as ultrasound, TENS (transcutaneous electrical nerve stimulation), cold laser, and manipulation have routinely failed to produce beneficial results in regards to DOMS.<sup>2,3,4,5,6</sup> Compression therapy appears promising but is only really practical when a single joint is involved. Quite often physical therapists will use compression in the form of a sleeve over the elbow or knee as examples.<sup>7</sup>





Biochemical therapies have for the most part also failed to produce better results than the natural history explained above. There is no beneficial effect from many medications in the management of delayed-onset muscle soreness.<sup>8</sup> However, the most common non-steroidal anti-inflammatory drug (NSAIDs) for muscle soreness is ibuprofen which may offer reduced pain but will not restore muscle function any faster.<sup>9</sup> The dose used in this study was 400mg every 8 hours, which is a fairly common suggestion, but may cause stomach irritation and side effects in some individuals. Many fitness enthusiasts swear by it, while others suggest it actually slows the healing process. In order to repair the muscle it is the inflammation that does the repair. By artificially slowing inflammation, it seems reasonable that it impairs recovery. We think other alternatives provide better solutions.

### Alternative Treatments for DOMS

Conversely alternative therapies appear to be much more promising. Acupuncture seems to have no effects on pain threshold and muscle function - meaning one's range of motion, pain on movement and stretching is still present; however, it proved to reduce perceived pain arising from exercise-induced muscle soreness.<sup>10</sup> This is key since DOMS isn't muscle injury, we just want to feel better. What is unclear though is the question of if acupuncture reduces the time of the painless period in which true injury is likely to occur. In small studies, similar results were seen with massage therapy and frequency specific microcurrent (FSM).<sup>11,12</sup> Earthing or grounding may actually speed healing. This is the process of reducing electromagnetic exposure by walking barefoot or using a grounding mat. However, the study was small and primarily designed to develop future research so a firm conclusion cannot be drawn yet.<sup>13</sup>

Evidence suggests that rather than inflammation, free radical damage or oxidative stress may be the root cause of DOMS<sup>14</sup> but administration of well-known antioxidants such as vitamin C does not appear to improve the situation and may in fact make things worse by slowing recovery.<sup>15</sup> Vitamin E at higher than commonly used dosage (1000 IU) offers slightly better protection but more so in older individuals.<sup>16</sup> The vitamin and antioxidants seem to be best consumed via foods rich in colors and flavors as the evidence so far really does not support individual antioxidants for recovery.<sup>17</sup> Interestingly non-vitamin antioxidants such as creatine and melatonin potentially are different still providing additional, yet unexplored, benefits beyond antioxidant capacity.

Creatine, a chemical made by the human body has been studied extensively in athletic performance and is known to be depleted in individuals who are suffering from muscle soreness. In healthy individuals, creatine monohydrate may have some benefit although dose and safety have been called into question. Because safety concerns still surround it and the scientific conclusions aren't yet firm, we recommend only using it if you are being monitored by a licensed practitioner. Finally, another antioxidant that has gained a lot of attention over the last several decades that may be helpful is green tea. Because it has so many other benefits, green tea may be a prudent intervention to slow the oxidative stress process caused by exercise soreness.

Melatonin is becoming well-known for its antioxidant and anti-inflammatory capacity. Melatonin and exercise have reciprocal benefits. As discussed, strenuous exercise causes oxidative stress and more specifically can deplete melatonin levels. Melatonin use can increase the low levels and also combat the free radical production and restore function. A group of researchers gave football players a high dose of melatonin (6mg) before a training session. None of the players fell asleep during the experiment. However, these researchers concluded that melatonin offered a significant benefit. The question we would ask is in regards to dose. Is 6 mg the appropriate dose for midday activity or would a lower dose offer similar benefits? The body actually produces 0.3mg per day (physiological dose) and research has indicated that introducing high doses such as 6mg can impact the body's own production and receptor sites. For this reason many experts always recommend starting with 0.3mg and potentially building up to 0.6mg or 0.9mg. In very different athlete type, runners, researchers found that the use of melatonin before exercise supported the biochemical markers of stress. Again, no runners fell asleep on the track!

Most melatonin is either derived from the pineal gland of animals such as cows or synthesized in a lab. However recently, for the first time, a source from plants has also been introduced called Herbatonin. Herbatonin is not only natural but has a very high bioavailability and naturally slow release action, in fact early animal studies on its use as an antioxidant are proving considerably more effective than synthetic melatonin.

### Folklore Treatments for DOMS

Gym folklore suggests drinking pickle juice to reduce muscle soreness. The mineral content of pickle juice may or may not have any effect on recovery. Glutamine, magnesium, and fish oil are also now commonly suggested by fitness professionals to reduce the inflammatory component and restore function faster. These have yet to offer significant benefit in rigorous studies, but because they offer benefits





beyond muscle soreness, new athletes and those of us returning to the gym may have benefit from a routine program of these three giants in performance supplementation. Common dosages are 2-20 grams of glutamine, 300-400 mg of magnesium, and 2-3 grams of fish oil each day.

Another folklore solution to aid in recovery are sports drinks. Immediately post workout is a critical time to replenish our electrolytes, however most commercially available sports drinks are woefully inadequate in regards to the full spectrum of actual electrolytes, have poor structure in relation to hydration rates and simultaneously contain either excess sugar, artificial sweeteners or ingredients like artificial colors or brominated vegetable oil, which is finally being removed from Gatorade. Alternatively I have all of my patients use Sole (so-lay) therapy. Sole therapy uses Original Himalayan Crystal Salt to create a powerful trace mineral water that consists of 84 trace minerals in almost identical ratios to what exist in our body and by improving the structure of water has the potential to double hydration into cells. Sole can be used 2-3 times daily by new athletes depending on the amount of exercise they do and after the most strenuous exercises for all. An important fact to point out is that when we are new to training or returning after an extended break, our sweat is actually different to elite or seasoned athletes. New trainers actually excrete more salt in their sweat because our body has yet to adapt to the excess perspiration. Until our kidneys catch up with our enthusiasm, we are susceptible to that salty ring on our gym shirts and thus why using Sole 2-3 times a day depending on how much exercise you do can be critical.

And then there is the age-old practice used by football and rugby players of ice bathing or wading in extremely cold lakes or oceans the next day after competition to reduce inflammation and change blood flow to the area. While there isn't much literature many trainers, coaches, and players will swear by this practice.



### Stress and DOMS

New or higher level activity is a stress. Typically we think of it as a "good" stress, but the line is thin between good and too much. I explain to patients that we "thicken the line" by supporting the entire body and its ability to deal with stress through the neuroendocrine system which controls hormones and neurotransmitters that impact our stress such as cortisol, epinephrine, serotonin and so much more. After a lot of investigation into published clinical research I settled on two products in my practice, one for men and one for women. They both support the neuroendocrine system and the body's ability to adapt to exercise and increase energy however each does it in a specific way based on gender and in fact the women's product is the first to ever be able to clinically prove statistically significant effects on hormones in peri and post-menopausal women. For men I use Revolution Macalibrium a highly concentrated (10-20 times what is found in raw maca) and bio available proprietary combination of specific phenotypes of the herb maca for men. Many people are not aware that there are many different types of maca. They are different colors, have different DNA, different active constituents and even elicit different physiological effects in the body. For example research shows that there is one phenotype of maca which impacts fertility in men, but a different one for women, one phenotype has been shown to reduce the size of the prostate in men, while none of the others do. In relation to energy, cholesterol and bone density again there are different types which have a significant impact while the others don't. For women I use a product called Femmenessence, which is also made highly concentrated (10-20 times what is found in raw maca), bio available maca, however uses different types specifically for a woman's biology.

It is important to remember that being sore after a good workout is not a reason to throw in the towel. If the pain is not tolerable, the best thing to do is get back in the gym with a more conscious effort in warming up prior to heavy lifting and giving yourself 1-2 weeks if you are more experienced and 6 weeks if you are a novice or have not trained in years of lower, yet progressive intensity effort before tackling the same workout that caused the pain.<sup>16</sup> If the thought of going back to the gym gives you the heeby jeebies, work on active recovery. Drink plenty of water, sleep, use a foam roller or get a massage and do some light activity like easy rowing or swimming or house work such as vacuuming, folding laundry, and taking out the trash. Keep your diet clean and avoid known irritants to the digestive system such as gluten, dairy, and even legumes for the short term. This allows your body to devote more attention to recovery as opposed to those things that are causing irritation.





### In review, for delayed-onset muscle soreness, consider the following

- Get a massage or acupuncture treatment
- Use compression therapy if soreness is localized to a single joint
- **Revolution Macalibrium** for men, 4 capsules per day or your regular dose
- **Femmenessence** for women, 4 capsules per day or your regular dose
- 3-4 liters of water per day with 2 daily doses of Sole using **Original Himalayan Crystal Salt Stones**
- Sole bath using **Original Himalayan Crystal Salt Bath**
- **Herbatonin 0.3 mg**, 1 capsule each night or prior to intense exercise
- Green tea extract, 100 mg four times daily or four cups of brewed tea
- Glutamine, 2-20 grams daily
- Magnesium, 300-400 mg daily
- Fish oil, 2-3 grams daily
- Get back in the gym, but this time, go a little lighter

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