

Myths and Truths of Recovery Techniques



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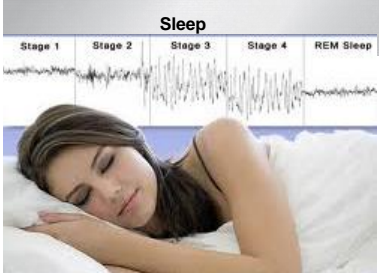
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Outline

1. Sleep the ultimate recovery strategy.
2. Foam rolling decrease delayed onset muscle soreness?
3. Clearing Lactic Acid to Reduce Delayed On-Set Muscle Soreness
3. Ice Baths
4. Post-workout snacks start the process of repair and preparation for the next workout. CHO & PRO.

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Sleep



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Healthy Sleep

90 min sleep cycles.

Roll through 5 stages of sleep.

5 - 6 cycles

7.5 - 9 hours sleep



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Sleep and Recovery

"A universal recovery strategy that is essential to both physiological adaptation and to the consolidation of skill development."
Gordon Sleivert, Ph.D., Canadian Sport Centre Pacific.

"Sleep duration may be an important consideration for an athlete's daily training regimen." Cheri Mah, Ph.D., Stanford Sleep Disorders Clinic.

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Sleep and Recovery

Proper sleep helps athletes and fitness clients in two ways:

1. Boosts performance by improved cognitive function, reaction time, and hand-eye coordination.
2. Aids recovery from games and workouts. Sure bet for our clients wanting the added advantage from their workouts.

Clients will get a better work-out because good sleep helps with productivity and concentration, increased energy, and improved mood.

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Sleep and Recovery
Sleep as a recovery tool for athletes (2014). British Journal of Sports Medicine Charles Sarnuelo and Lois James

As a result of research and knowledge, athletes, coaches, sport medicine physicians and trainers are interested in understanding the relationship of sleep to training, recovery and performance in athletes and fitness clients.

Athletes have unique physical and mental demands, have to accommodate rigorous competition and training schedules, and have to adapt to difficult travel regimes.

Our clients have unique physical and mental demands too: work, travel, family, kids, kids sports, kids homework, house work.

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Sleep and Recovery

Sleep factors have been shown to have a direct effect on:

- executive cognitive function¹⁸
- metabolic control of energy balance, appetite and weight^{19,20}
- tissue repair²¹.
- Cognition, metabolism and tissue repair are critical physiological processes that contribute to training capacity, recovery and performance.
- Recent research on athlete populations has provided objective evidence that confirms the importance of sleep in athlete development and performance^{19,22}.
- It is the same for our fitness clients.

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Sleep and Recovery

The relationship of sleep to post-exercise recovery and regeneration can be viewed in a structured fashion:

- Sleep length (total sleep requirement: hours/night, plus naps).
- Sleep quality (sleep disorders, environmental disturbance or sleep fragmentation).
- Sleep phase (circadian timing of sleep).

These three parameters of sleep are the key factors affecting the overall recuperative outcome of the sleep state²³.

They affect an athlete's ability to train, maximize the training response, perform and recover²⁴. Capitalizing on the restorative power of sleep will help maximize energy, mood, decision-making skill and reflex response.

In addition, attending to the importance of sleep will reduce the risk of overtraining/under-recovery, enhance resistance to illness and improve recovery from injury²⁵.

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Sleep and Recovery
Sleep Length, Quality, Circadian Timing

Sleep Length:

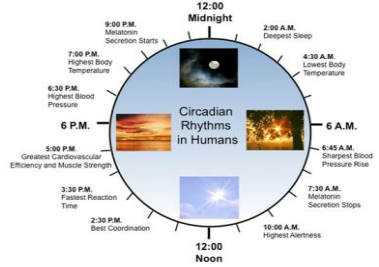
- 8 to 12 year olds need about 9.5 to 10 hours
- 12 to 15 year olds need about 9 hours
- 16 to 22 year olds need about 9 to 10 hours per night.
- Naps can count towards total sleep time, should be restricted to 30 minutes and should be scheduled between 2 to 4 pm for the average sleeper.
- Strategic napping may be particularly beneficial for young athletes who, due to school commitments and training, may not be able to achieve the recommended amount of sleep per night.
- Quality Can be Enhanced:
 - Bedroom like a Tomb: Cold, Dark, Quiet.
 - Turn off all devices 1.5 hours before bed.
 - Protect from sleep disturbances: noise, light, reliable alarm clock.
 - Bed time ritual.

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Sleep and Recovery
Sleep Length, Quality, Circadian Timing

- Circadian rhythms are a 24-hour internal clock running in the brain.
- The "rhythms" cycle between sleepiness and alertness.
- Also known as . . . "Sleep / Wake Cycle."
- We have dips in energy between 2:00am and 4:00am (when we're fast asleep) and in early afternoon (1:00pm to 3:00pm).
- This is when we crave a [nap](#).
- Dips in energy can be different if you're naturally a "Lark" or "Owl."
- This is Chronotype.

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Foam Rolling



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Foam Rolling

Wewilhoes, T., et al. (2019). A Meta-Analysis of the Effects of Foam Rolling on Performance and Recovery. *Frontiers in Physiology*. <https://doi.org/10.1155/2019.2019.00019>

Wewilhoes, et al. (2019) meta-analysis investigate effects of foam rolling before (pre-rolling as a warm-up activity) and after (post-rolling as a recovery strategy) exercise and tested with sprint, jump, and strength performance and flexibility and muscle pain perception.

Pre-Rolling as a Warm-Up Activity
Pre-rolling: improvement in sprint performance and flexibility, but the effect on vertical jump height and strength performance were negligible.

10 studies using foam rollers and four that used a roller massage bar/stick.
Rolling protocols ... foam rolled or used a roller massage bar/stick for 30-seconds, 5 strokes per 30 seconds, 3 intervals of 30-seconds, 3 minutes, and 2 minutes.

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Foam Rolling

Wewilhoes, T., et al. (2019). A Meta-Analysis of the Effects of Foam Rolling on Performance and Recovery. *Frontiers in Physiology*. <https://doi.org/10.1155/2019.2019.00019>

Post-Rolling as a Recovery Technique
Post-rolling lessened exercise-induced decreases in sprint and strength performance, while reducing muscle pain perception (Delayed Onset Muscle Soreness).

According to rolling protocols reported the foam rolling and/or roller massage bar/stick was performed in the following manner:
- two 60-second bouts on five body parts
- 20 minutes of foam rolling immediately after, 24, and 48 hours post intense exercise
- foam rolling using small kneading motions
- Iliotibial band were rolled for 30-seconds.

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Foam Rolling

MacDonald, G.Z., et al. (2011). Anabolic Out of self-myofascial release increases range of motion without a subsequent decrease in muscle activation or force. *J Strength Cond Res*, 27(3):812-21.

Does foam rolling would reduce delayed-onset-muscle-soreness?
10 sets x 10 reps of squats 60% of 1RM
4-sec eccentric and 1-sec concentric
2 minutes rest between sets.

Foam rolling group:
Foam rolling exercises for 2 bouts of 60-seconds per exercise, 0, 24 and 48 hours.

Muscle soreness was significantly reduced in the foam rolling group in comparison with the control group at 24, 48 and 72 hours post-workout.

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Foam Rolling – Athletic Performance

Halperin, L et al., 2014 and Sullivan, K.M., et al., 2013.

Current evidence suggests foam rolling does not adversely affect athletic performance:

- Muscle strength, power, jumping, and agility.
 - Foam rolling is superior to static stretching.
- Hutchinson, (2019) foam rolling could reduce tissue adhesions, activate mechanoreceptors, increase blood flow, or trigger endorphins.

It could also be that foam rolling is, or has, a placebo effect.

In other words, regardless of the physiology, foam rolling feels good after it is done.

Part of a trainer's job make clients feel better, before, during and after a work-out.

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Clearing Lactic Acid

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Lactic Acid Causes Delayed On-Set Muscle Soreness

Over the last 30 or 40 years one of the world's leading exercise scientists has been Dr. George Brooks at University of California – Berkeley.

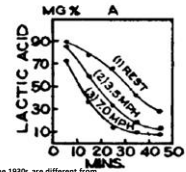
Dr. Brooks has led the way in showing a number of things:

- under most circumstances lactic acid is not caused by lack of oxygen, or "anaerobic" conditions.
- He and other colleagues have also shown that the lactate part of lactic acid can actually be a fuel for muscles and the heart and that the acid part of lactic acid is not the cause of fatigue.
- It might be a contributor, but fatigue is multi-dimensional and caused by a number of factors.
- Believe it or not, lactic acid is probably not causing the "burn" associated with intense exercise either.

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Lactic Acid Clearance After Intense Exercise

The rate of lactic acid removal in exercise (1937). E. V. Newman, D. B. Dill, H. T. Edwards, and F. A. Widdar. 28 FEB 1937, American Journal of Physiology



The units used in the 1930s are different from today's measurements—10 mg% is equal to a modern value of about 1 millimoles/L.

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Phys Sportsmed. 1983 Mar; 11(3):124-31. doi: 10.1080/00913847.1983.1170885. Is Lactic Acid Related to Delayed-Onset Muscle Soreness? Schwane JA, Watson RG, Johnson LS, Armstrong BB.

Authors tested the hypothesis that delayed-onset muscular soreness after running is related to the production of lactic acid during the exercise.

Blood lactic acid concentration was measured before and during 45 minutes of treadmill running, one time on the level and once at a 3-10% incline.

Blood lactic acid concentration and subjective sensations of muscular soreness were assessed at intervals for 72 hours after the runs.

Lactic acid concentration was significantly increased during running on the level, but subjects experienced no significant post-exercise muscular soreness.

Lactic acid was never elevated in downhill runners, but subjects experienced significant delayed-onset soreness.

Results indicated that lactic acid is not related to exercise-induced delayed-onset muscle soreness

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What Causes Delayed-Onset Muscle Soreness?

Exercise or other physical stresses outside your normal range of intensity — anything you aren't used to.

Well-conditioned athletes can get DOMS, if they train harder than usual, or do an exercise they aren't used to.

But as muscles get familiar with a specific stress, they quickly adapt and react much less strongly; repeated bout effect (RBE).

But how far outside your exercise comfort zone can you wander before DOMS strikes?

Two of the most common causes of DOMS:

1. "Eccentric" contractions cause DOMS far more readily than concentric contractions.
2. Exercise our clients are not used to.

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Can DOMS Be Reduced by Doing a Cool-Down

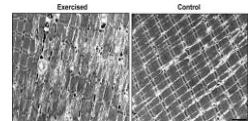
The damage is already done.

Microscopic tears in muscle fibers.

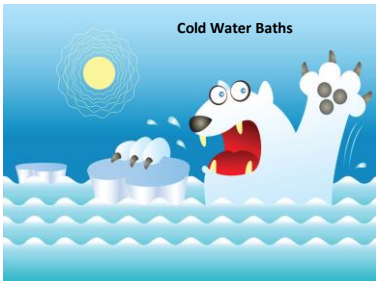
Basically nothing we do AFTER exercise can reduce/prevent/or lessen the effects of DOMS.

Before the next exercise session, some things have been shown to reduce the pain of DOMS:

- Static stretching
- Dynamic stretching
- Mobility exercises
- Foam rolling
- Any kind of warm-up.



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Cold Water Baths

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Cold Water Baths

Sánchez-Ureña, et al., (2017) compared two cold water immersion protocols, continuous or intermittent, on recovery in basketball players (10 male basketball players, 14 yrs). The results indicate both cold water immersion protocols were effective in reducing muscle pain 24 and 48 hours after training compared with the control. There were significant differences in countermovement jump after 24 and 48 hours of cold water immersion compared to the control.

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Cold Water Baths

Crystal, et al., (2013) investigated the effect of ice baths on the inflammatory response to muscle-damaging exercise. Twenty subjects did a 40-min run at a -10% grade. Ten of the subjects sat in a 5 °C ice bath for 20 min and the other ten served as controls with no bath. Knee extensor peak torque, soreness rating, and thigh circumference were obtained pre- and post-run, and 1, 6, 24, 48, and 72 hours post-run. There were no differences between groups in knee extensor peak torque or soreness rating.

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Cold Water Baths

5 potential benefits of ice baths
 If you're considering trying an ice bath, you might be wondering what the potential benefits are, and if it's worth subjecting your body to the a little cold.
 The good news is there are a few potential benefits of using an ice bath, especially for people who work out or are competitive athletes.

- Reduces sore and aching muscles**
 According to Gardner, the greater the relief of ice baths, most likely is that they help you feel better after a workout.
- Helps your central nervous system**
 Gardner explains that ice baths can help your central nervous system by sending it a signal, a mild convulsion, making you feel better from having less fatigue.
- Reduces the inflammatory response**
 The theory is that decreasing the local temperature after exercise helps limit inflammatory response, decreasing the amount of inflammation and allowing you recover faster.
- Decreases the effect of heat and humidity**
 Taking an ice bath may decrease the effect of heat and humidity. An ice bath prior to a long race in conditions where there is an increase in temperature or humidity can lower core body temperature a few degrees which can lead to improve performance," explains Gardner.
- Trains your eyesight**
 One of the main benefits of an ice bath says certified strength and conditioning specialist [Dustin Sotnick](#). "Cold, CPT's have been able to train your eyesight."
 "The signals come in through the parasympathetic nervous system, and training it can help you face stressful situations more adequately," he explains.

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Cold Water Baths

Side effects and risks of ice baths
 "The most noticeable side effect of an ice bath is feeling very cold when you immerse your body in the cold water. But beyond this superficial side effect, there are some other risks to consider."
 "The primary risk of an ice bath applies to people who have a preexisting cardiovascular disease or high blood pressure," explains Gardner.
 "The decrease in core temperature and the immersion in ice constricts blood vessels and slows the flow of blood in the body," he says. This can be dangerous if you have decreased blood flow, which Gardner says places you at risk for cardiac arrest or stroke.
 Another risk that may happen is hypothermia, especially if you're submerged in the ice bath for too long.
 People with type 1 and type 2 diabetes also need to be careful with ice baths since they're both associated with [Trusted Source](#) reduced ability to maintain core temperature during extreme temperature changes.

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Cold Water Baths

Tips for taking an ice bath
 If you're ready to take the plunge, there are a few things you should know before submerging your body in ice.
Temperature of ice bath
 The temperature of an ice bath, says Gardner, needs to be approximately 10-15° Celsius or 50-55° Fahrenheit.
Time in ice bath
 Spending too much time in an ice bath can have adverse consequences. That's why you should limit your time to no longer than 10 to 15 minutes.
Body exposure
 Gardner says it's generally recommended to immerse your entire body in the ice bath to gain the best effect of blood vessel constriction.
 However, to start out, you may want to first expose your feet and lower legs. As you get comfortable, you can move toward your chest.
At-home use
 If you decide to take an ice bath at home, Gardner says to use a thermometer to help you achieve the ideal temperature when balancing the ice to water mixture.
 If the temperature is too high (above 15° C or 59° F), add warmer water. And if it's too low, gradually add ice until you reach the desired temperature.
Timing of bath
 "The sooner you get in an ice bath after a workout or competition, the better the effects should be," says Gardner.
 If you wait an hour after the workout, he says some of the healing and inflammatory processes have already begun or have already finished.

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Post-Workout Snacks, Meal, Drink



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Myths about Post-Workout Protein and Recovery

Myth: Large amounts of protein are necessary for recovery
 No.
 Some protein is helpful for recovery, but it is unlikely that you need protein supplementation.
 The Recommended Daily Allowance (RDA) for protein is .8 grams/kilogram of protein per day. This increases to about 1.2-1.7 g/kg for athletes in a medium- to high-workload training plan (in terms of volume and/or intensity).
 But consuming more than 2 g/kg of protein doesn't do you any more good in terms of recovery, muscle synthesis, immune function, or energy metabolism.
 Whether you are a carnivore, omnivore, vegetarian, or vegan, you should be able to consume 1.2-1.7 g/kg of protein daily through your normal meals and snacks.

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Myths about Post-Workout Protein and Recovery

Myth: Post-Work-out Snack or Shake should be Protein
 No . . . PRO and CHO
Adding protein to carbohydrate snack - 3:1 (CHO:PRO) stimulates glycogen re-synthesis to a greater extent.
6 – 20 grams of PRO and 30 – 40 grams of high-glycemic CHO within 3 hours after exercise significantly stimulates muscle protein synthesis.

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Post-Workout Snacks, Meal, Drink Protein (6 – 20 grams)



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Post-Workout Snacks, Meal, Drink CHO (30 – 40 grams)



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Myths about Post-Workout Protein and Recovery

Myth: You need a recovery drink after every workout.
 No
 Depends on intensity, duration, and exercise.
 If the work-out was relatively easy, then CHO and PRO can be replaced with subsequent meals.
 If our client is training for a marathon, triathlon, adventure race, etc... then there's a lot of CHO used and a need for PRO.
 Long "cardio" work-out... CHO is needed.
 High intensity weight training... CHO and PRO.
 Relatively normal intensity class... Water will do it.

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Thanks for coming!!

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