FATIGUE
RECOVERY, AND SUPERCOMPENSATION

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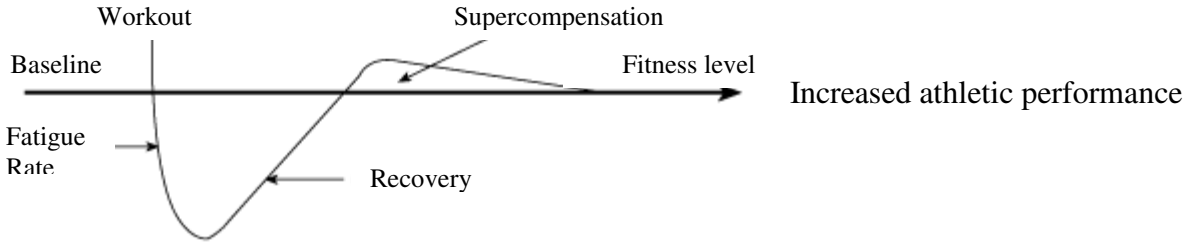
Gains are made when the body fully recovers from workout, not during the actual workout. An athlete may see gains in performance during the workout, but this is due to full recovery and supercompensation. During and after an intense workout there is an initial breakdown of muscle fibers and depletion of naturally occurring substances (nutrients) in the body, leaving the body and Nervous system in a state of fatigue post workout. From this state of fatigue the body begins to rebuild itself through rest and an increase in protein synthesis, to rebuild the muscle fibers and nervous system back to its original baseline level. The period from level of fatigue to baseline level is known as compensation. Now, if an athlete allows for proper recovery from initial fatigue to the next workout (graph I), he/she may then achieve supercompensation. This is where the muscle/Nervous system is built up beyond the original baseline, creating a new level of physical condition. This is the goal of training. That is, training smart, recovering well, and supercompensating completely.

GRAPH I

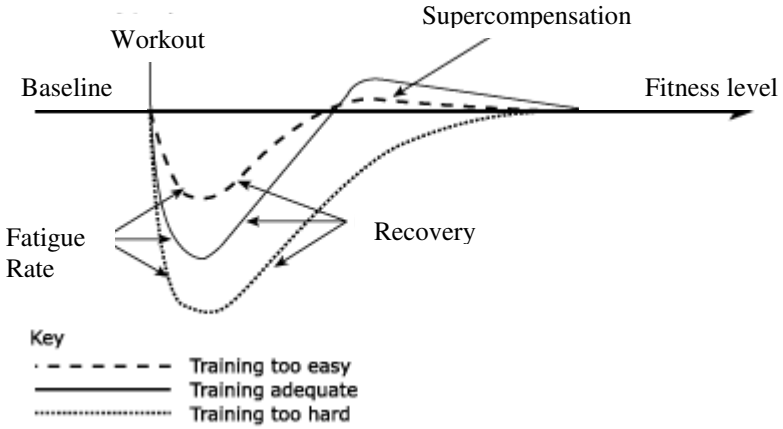
Ideal workout and recovery situation from single workout



Above is an example of an ideal situation. As athletes it is difficult to know if one is completely recovered or not, given the intense practice schedules and short off seasons for some sports. An athlete may feel ready to workout 3 days later after inducing a 6-8% fatigue rate during a previous Max leg workout. 73 hours may be too short for supercompensation to occur, so the athlete may return to the initial baseline Fitness Level. If the athlete then chooses to workout again the next day, training reactive lower body and inducing a 10-12% fatigue rate, his graphical fatigue rate may be great (Graph II bottom dotted line). If he then follows a 4-day per week cycle, his/her next workout may be scheduled for the 48 hours later. 48 hours may not be enough time for recovery to the initial baseline level for compensation to occur, never mind reaching supercompensation.

GRAPH II

Example of overtraining, under-training, and ideal training to recovery situations



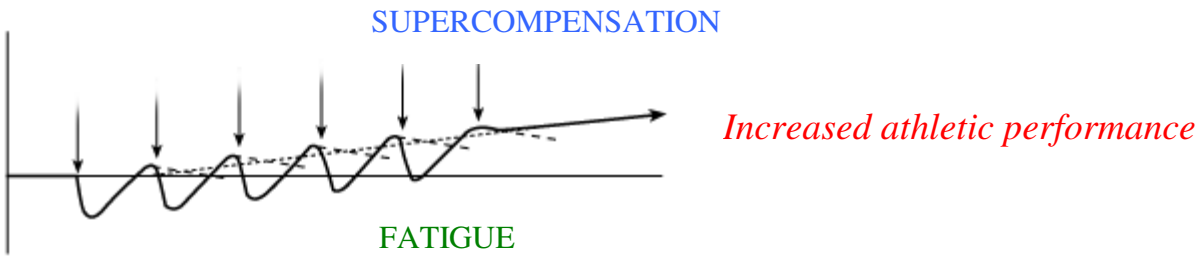
According to Siff, (1) “If subsequent loading is imposed too soon during the recovery stage, then supercompensation fails to occur and performance continues to decrease.” If recovery is not adequate (does not return to initial baseline pre workout), the athlete runs the risk of returning to below the baseline level. This is where the effects of overtraining begin to appear. The athlete keeps reducing the pre workout initial baseline until performance deterioration, injury, fatigue, or other symptoms of overtraining begin to appear. To avoid this, Autoregulatory training methods are used. This teaches athletes to listen to their bodies and rest and train accordingly. For this reason, SuperUPZ does not require athletes follow a strict “days per week” regimen. Instead, the program is designed to rest when needed, and perform the next biomechanically similar workout after supercompensation has occurred, and performance potential for the next workout will be at its peak.

The opposite scenario is when the athlete’s workouts are too easy, rest is too long, and they achieve the exact opposite of overtraining, under-training. In graph I, the top dotted line shows the effects of an easy workout. There is a minimal rate of fatigue induced during the workout, leading to a recovery just above the initial baseline. The graph shows the minimal results last a very short period of time until the initial baseline is achieved again. For an athlete in training, this is a waste of time and energy. Autoregulatory training methods exist to avoid this training pitfall as well.

In his book Science and Practice of Strength Training, Zatsiorsky states "during periods of strenuous training, athletes cannot achieve the best performance results for two main reasons. First, it takes time to adapt to the training stimulus. Second, hard training work induces fatigue that accumulates over time. So a period of relatively easy exercise is needed to realize the effect of the previous hard training sessions- to reveal the delayed training effect." Zatsiorsky also states "It is assumed that for none workout with an average training load, the durations of the fitness gain and the fatigue effect differ by a factor of three: The fatigue effect is three times shorter in duration. This implies that if the negative impact of fatigue lasts 24h, the positive traces from this workout will remain through 72h." As can be seen, there are general guidelines to fatigue values and when to workout again. This is not an exact science. Following the recommendations of Siff and Zatsiorsky, a 6-10% inducement of fatigue every 4^{th} – 7^{th} day could be optimal for most athletes. (This means if you induce a 6% fatigue value during your workout, you will need to wait another 4 days until training a similar motor unit pattern to promote supercompensation.) If an athlete wanted to train at a higher intensity, a greater fatigue rate (10+%) would be induced every 7-9^{th} day. Graph III depicts the long-term results of following a proper recovery to workout schedule. The end result is supercompensation from each workout and over time. These are strong scientific guidelines only, remember, each athlete is an individual, so the each program/system has to be individualized to increase his/her performance. After all, isn't the goal of training… to increase performance?

GRAPH III

IDEAL RECOVERY SCHEDULE



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