

# To Study the Methods of Monitoring and Adjusting Weight Training for Enhancing the Muscular Strength of Athletes

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## **Abstract**

The study will outline strategies for monitoring an athlete's total strength and assisting them in future improvement. It takes a lot of muscle strength to move or use your body in other ways. This study aims to support future initiatives to monitor or enhance athletes' muscle strength in various ways. Numerous professionals have referred to periodisation as a cycle and stressed the necessity to "circle back" following particular training blocks. The overall volume and Weight Training of exercise vary from training period to training period as athletes age. Coaches can adjust training programmes based on their athletes' needs and physical development by monitoring the quantity of their training sessions. They can also look back to check how the training cycle is progressing. In order to assist athletes in becoming stronger, coaches now track and manage the Weight Training of athlete. This study also sought to provide coaches with useful guidance on how to train and track development. When coaches monitor their athletes' strengths, they can identify areas for improvement and those where training should be slowed down. The neuronal activity in muscle fibres can now be improved, which will help athletes increase their speed and force production.

*Keywords: athletes, fitness, strength training, muscular strength, weight training*

## **Introduction**

For any sports person, muscular strength is a critical area to focus on for example jumping vertically, anaerobic conditioning, modified directions etc. As a result of multiple factors which can have an impact on the training program of an athlete, it is very important to regularly monitor and track the motor capacity of a sportsperson (the strength of an athlete). The motor capability of an athlete ensures his strength so that it can be tracked how the athlete is responding to a particular training session. According to Healy et al. (2021),

monitoring an athlete's strength and capacity includes two essential but overlaying purposes: the management of fatigue and the efficiency of the program. To manage fatigue, scientists in sports departments look for the detection of acute and accumulative fatigue, which increases the expected magnitude and impacts the recovery process negatively (Weldon et al. 2021).

Muscular strength is an important motor talent or attribute that contributes to motor performance (e.g., vertical jump, sprinting, change of direction, anaerobic conditioning, etc.). Due to the numerous factors that might influence an athlete's training programme, it is essential to frequently assess and monitor an athlete's motor capacity (i.e., strength), motor competence, and motor performance (Suchomel et al. 2021). This allows strength and conditioning professionals to determine how their athletes respond to training (Read et al. 2020). Managing tiredness and determining the efficacy of a programme are two essential aims of athlete monitoring that occasionally overlap. Sports scientists and practitioners search for excessive short- and long-term weariness that has a negative impact on the stimulus-recovery-adaptation process (Radnor et al. 2020). This assists them in determining how to deal with it. To ensure that the stimulus remains effective over time and to prevent a significant performance decline, fatigue management entails daily varying the volume and Weight Training.

Fatigue management includes manipulation of Weight Training and volume every other day to ensure that stimulus remains effective after the period and that any decline or hurdle in an athlete's overall performance can be avoided (Drury et al. 2021). The program's efficacy includes the size up to which the training produces the needed and expected results. Overall, fatigue management and the efficacy of the program place the role of monitoring the fitness characteristics of the athlete and the underlining mechanism throughout the training era of an athlete. The tracking and monitoring of an athlete's strength or motor capacities and changes in coordination, especially in performance, usually result from "learning the utilisation of one's newly discovered strength" (Radnor et al. 2020). This is specifically essential because multiple athlete constraints can affect the prescribed training considerations. Hence it is essential to discuss the latest methods for monitoring strength characteristics and how these methods can these methods can be used to modify training stimuli so that the athlete can have the overall benefit and can see a positive impact on his motor performance (Read et al. 2020).

## Rationale

The reason for the conducted research is to assist the multiple ways in which the muscular strength of an athlete can be monitored or improved in future. Athletes are an essential asset for any nation, and taking care of them and ensuring their fitness is the duty of the sports department (Read et al. 2020). Professional and well-tested approaches should be used for monitoring the strength training of an athlete. Recording and tracking sets and repeating the same for some time, and increasing Weight Training as per the capacity of the athlete has always been a part of long-term monitoring strategy among conditioning and strength practitioners (Bell et al. 2021).

The research will put a spotlight on techniques which can be used for tracking an athlete's overall strength and improvising them accordingly in future. Many professionals have referred to the cyclical nature of periodisation and the necessity of "circle back" in particular blocks of training. Since athletes develop, the overall training volumes and Weight Training differ from various phases of training. Tracking the volume and Weight Training of training helps professional coaches to make alterations as per the requirements and development in the body of the athlete and to take a step back to view the future picture of the training cycle (Pitchers & Elliot-Sale, 2019). Hence, the motive behind this study is to analyse the current methods that coaches use to monitor and adjust the Weight Training in training for the strength development of an athlete and provide a recommendation to them which are practical in nature on how to train and monitor the progress. The continuous monitoring of the strength capacity of the athletes allows coaches to know the areas in which they need to work and the parts where they have to slow down the training.

## Literature review

**Healy et al. (2021)** said that the increased interest of young people in sports and various methods of fitness training, strength and conditioning within combat sports have become more common and acceptable. The days when the old school coach for boxing would tell them to not lift weights as it might make them bulky and slow are gone. Many types of research have shown that proof-based strength and conditioning go perfectly well with multiple sports performances. Combat sports include kickboxing, boxing, MMA, and other traditional martial fighting styles. Strength training and conditioning can be described as physical training, which is designed to assist a particular activity, mainly a sport but can also

be an occupation; it is opposite to what training for general fitnesses. Combat sport falls into the category of strength and conditioning since they assist the athletes in training well for such sports. Weight training and some other forms of resistance training, speed and agility etc., can also be included. Usually, the main goal of a bodybuilder is to gain muscle size and definition (low per cent body fat) for the purpose of aesthetics. Though, a certain level of rice in strength does not define a package of potential terror. The strength and conditioning training has a Central point on applied GPP and SPB enhancement in corners of strength and conditioning. Athletes can focus more on increasing neural activity in the requirement of muscle fibre and its application for Speed and force production.

According to **Drury et al. (2021)**, there is no doubt that strength training has the prime focus of all athletes engaged in sports activities. Generally, it is the performance of a particular physical activity to improve the endurance and strength of muscles. At the same moment, strength training is often considered a negative practice. A notable number of female athletes fear that they might appear a bit too muscular, and some male athletes do not want to be termed as a bodybuilder. However, there are multiple types of strength training; not all of them result in excessive muscle building if performed correctly. Strength training has various advantages on an athlete's physic, whether male or female, and it also provides various mental health benefits. It is an advantageous and very rewarding hobby since it helps lose weight and increase overall lean muscle in the body. Ligament strength, bone density and improved metabolism are some other benefits of strength training. Strength training and conditioning not only help the body to increase muscle mass but also ensures the protection of gained muscles in future. Though the main focus of strength training and conditioning is on muscle building and endurance, it is also equally important for weight loss. In general, modern society is termed as less active physically and insufficient performance of physical activities due to improved technology and comfort in today's world. As a result of an inactive lifestyle, the problem of obesity and overweight is increasing day by day.

**Radnor et al. (2020)** said that, even though overweight people are visually observed and recorded, the correlation between fat weight and muscle weight can them and certain. Sometimes athletes make this common mistake during their training session: they go on cardio instead of strength training while training their body. Strength training results in gaining lean muscle mass, and if performed properly and regularly, athletes can gain a perfect body with the help of strength training. The program involving stem training can include light as well as heavy loads, which increase strength and boost other strength-related

characteristics. Another positive result of strength training is improved time-limited maximal force expression. Strength training can be highly beneficial for athletes and individuals who suffer from chronic diseases to eliminate those symptoms.

As per **Pitchers & Elliot-Sale (2019)**, strength training greatly boosts athletes' self-confidence. When a sports person is thoroughly involved in physical activities, which include strength training, they traditionally get into a personal program designed especially for physical development. When athletes realise that they have reached the professional level and have become stronger, achieved better results, and developed absolute mastery, they automatically start filling confident from the inside and proud of themselves and their achievements. Athletes realise that they can reach whenever they want to energy everything they wish in their lives. Strength training, when performed at the end of the day, can help the athlete to release stress and forget about upcoming competitions. Apart from that, strength training also has a very positive effect on the cognitive thinking of an athlete and allows them to complete tasks which include analysis more efficiently. While in the battleground, athletes have to do a lot of mental calculations and analysis before making any move; improved cognitive thinking helps them complete such tasks with better efficiency.

**Radnor et al. (2020)** suggested that strength training is not just for grown-up athletes; even children who are willing to become an athlete in future can benefit from it. Though children's journey to muscle training usually suffers from relying on misguided nations. There is usually this conception that strength training in children is effective and more prone to injuries than in adults. However, the result of strength training is almost similar in young athletes as in adult athletes, but the children do not gain as much mass muscle as the adult athletes do. Apart from that, under the proper supervision and the right guidance, strength training can be extremely beneficial since it improves metabolism and enhances a good mental state. Strength training also contributes to preventing the diseases like diabetes and obesity. It stimulates self-esteem and extracts positive emotions from the brain. Strength training at a young age can help children to gain experience, which will help them in their future journey of becoming professional athletes.

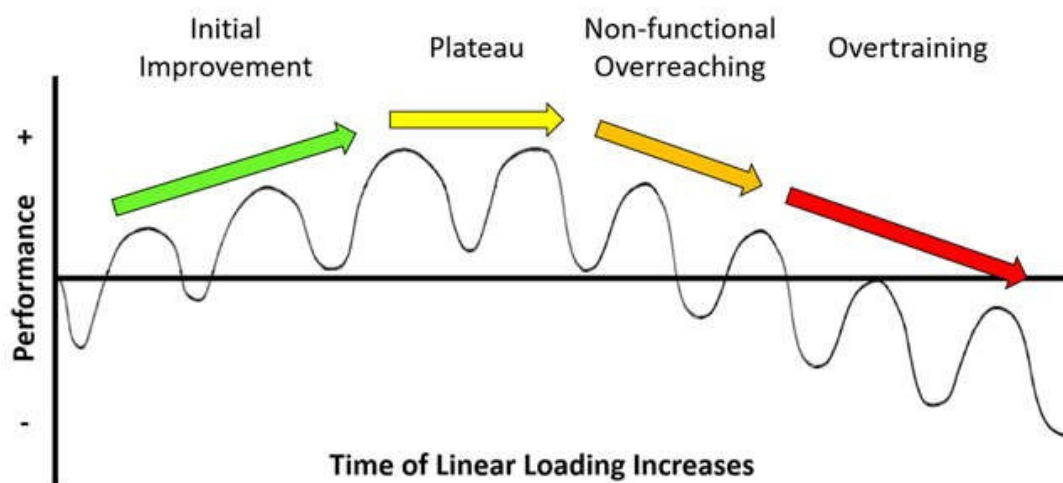
**Weldon et al. (2021)** found that the most important aspect of coaching is how coaches extract their knowledge. This is the terminus basis of coaching, the level in which the coaching occurs (professional, Olympic calibre or high school) and the place where the coach works. Although primarily coaches are teachers of sports, minimal, if there is any, education

is a must to become a coach. However, a degree in higher education must be earned before academic teachers are allowed to guide at any level. The basic education provided to the coaches is short and generally extends to 3 day weekend, continuously developing and changing in content and even, in some cases having its efficacy question mean while assuming the coach has gained some formal or previous education in that area. In general, coaches obtain knowledge from two main sources: practical experience and formal education. Experience gained by coaches in practical form is generally noted source of knowledge in coaching. Usually, this experience happens in two forms the gained from participating in athletic competition and also the ones which occur from coaching. The similarity between these two forms is the common place from which they are derived, the mentor coach. Coaches generalise these experiences as the most essential for their knowledge, followed by the second one, trial and error. The basic form of coaching knowledge apart from experience is knowledge from courses provided by coaching leading to certification. These courses help the instructors to provide coaches with needed information on multiple aspects of coaching, learning theory, motivational strategies, An idea of technique and how to transfer the knowledge most efficiently so that the athletes can get their expected results. In general, the common thing that is found is that the basic level of the certificate provides the basic knowledge necessary to coach.

## **Linear Loading Model**

Utilising an appropriate overload stimulus is essential for inducing specific changes in the body and performance. An overload is a training stimulus that causes an adaptation beyond the individual's current level of physical capability (DeWeese et al. 2015). This concept is utilised by linear loading, which steadily raises training loads to assist individuals in enhancing their maximum strength (i.e., weights prescribed for resistance training exercises). According to Miranda et al. (2011), linear loading can be beneficial for a limited time, but the training stimulus must be more diversified to prevent fatigue, aid in recovery and adaptability, and possibly aid in the consolidation of complicated motor abilities (i.e., observed improvement in lift performance between training sessions). Simply put, a greater emphasis on load variation (i.e., purposeful increases and decreases in load) would allow practitioners to place a greater emphasis on recovery and adaptation during each training phase throughout the entire training programme. Long-term linear loading will eventually impair an athlete's ability to recover and adapt in response to training stimuli (for example,

months to years, depending on the athlete). This maintains the same level of performance, causes non-functional overreaching, and, if it continues, leads to further overtraining (Fig. 1). Since linear loading is always increasing, it cannot be used to monitor an athlete's fatigue because it does not take into account how weary they become over time.



*Figure 1: Linear loading model for weight training*

## Percentage of One Repetition Maximum

Experts in strength and conditioning may find it most convenient to modify training Weight Training as a percentage of an athlete's one-repetition maximum (1RM). Typically, a 1RM is determined by determining the largest weight that can be lifted once with perfect form (Sheppard & Triplett, 2016). Since the number of repetitions is typically a function of the weight lifted (e.g., 95% 1RM = 2RM), this number can also be approximated by using the heaviest weight lifted for the greatest number of repetitions (Bompa & Buzzichelli, 2019). Once a 1RM has been determined, resistance training intensities are expressed as a percentage of 1RM based on the number of repetitions performed in each set and the fitness attribute being trained. It is also crucial to remember that the 1RM forecast loses some relevance as the number of repetition maximums (RMs) increases. Clinicians must be aware of the issues associated with prescribing loads based on %1RM. Particularly, a person's 1RM is a fluid figure that fluctuates according to their physical and mental state. In fact, training

exhaustion or other daily stressors (such as lack of sleep, poor diet, stress, etc.) can significantly impact an individual's maximum strength (Lopes Dos Santos et al. 2020).

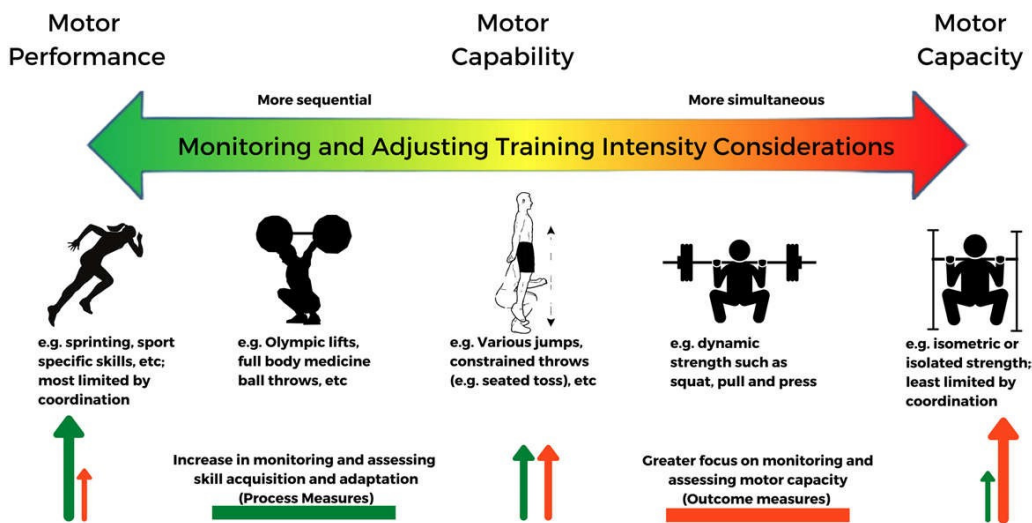


Figure 2: Lag-time in the transfer of training

## Discussion

The above-conducted research studies strength training and its impact on athletes' fitness and their future career. Sports can be easily described as one of the most discussed aspects of society. The evidence of its importance can be found in the typical newscast in any area as they include sports with other important scopes of news like weather and main news. The athletes are the pride of any country since they represent the entire nation in international competitions like the Olympics, commonwealth games etc. Health and fitness are always a matter of concern for the coaches of these athletes since they can only perform their best if they are physically and mentally fit (Berkovich et al. 2019).

Strength training allows the athlete to gain lean muscle mass and drop out fat since fat usually slows down the performance of athletes and almost Any other game. Coaches who train athletes are supposed to consciously track the physical activities and every minimal change happening in an athlete's body. It has been said that the coach is supposed to play five roles: teacher, organiser, competitor, learner and mentor. For an individual, this can be overwhelming since it is a large undertaking, especially for the coach who might not have formal knowledge in areas directly linked to sport, for example, psychology, injury



prevention, nutrition, rehabilitation etc. Because of dealing with responsibilities burdening on the coach as well as the requirement to provide coaches with formal knowledge this research has been conducted (Luczak, et al. 2020).

The research also forecasts the effect of strength training on young athletes and children who have yet to reach adulthood. Research figured out that strength training can actually be beneficial for kids though it might not result on the same scale as it does for an adult athlete. Daily a new form of training the body is being discovered, so coaches must do proper research before guiding the athlete to train. Proper strength training can help athletes physically and mentally since it helps them gain self-confidence.

## **Conclusion**

It can be concluded from the research that strength training is one of the best ways to train athletes for their respective areas of sports. Sports conditioning is used for the enhancement of athletic abilities of athletes to increase the chances of victory in the battleground. Eventually, the athletes and their respective coaches gain a specific training protocol structured for the enhancement of performance in any individual sporting event. In modern times training for performance has become a necessary science which can mainly only be learnt from formal knowledge and training. In countries like Australia and New Zealand, education related to sports science is common, and it focuses on the enhancement of performance by the national athletes of these countries.

It is generally found that around the sports science team are sports psychologists, professional coaches for strength and conditioning, sports nutritionists, medical professionals for sports, and a head coach, including staff. All these professionals provide a particular quality that others do not possess, resulting in the proper enhancement of athletic performance by the athletes. The basic education provided for coaches is usually needed for them to reach the professional level of coaching techniques to train National athletes. Hence, this gorgeous have to find other sources to stay updated with the current knowledge regarding health and nutrition. Coaches are responsible for athletes' training, and their performance completely depends on how their coaches train them. This puts coaches on utmost responsibility.

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