
Advanced Certificate in Sports Injury Prevention and Management

Strength and Conditioning Principles

Accommodating Resistance: A training method that involves increasing the resistance throughout the range of motion of an exercise, typically through the use of special equipment such as kettlebells or resistance bands. This method is used to overload the muscles and promote strength and size gains.

Active Recovery: A type of recovery that involves light physical activity, such as walking or stretching, after a strenuous workout. Active recovery helps to promote blood flow and remove waste products from the muscles, aiding in the recovery process.

Agility: The ability to quickly and efficiently change direction, speed, and movement patterns in response to a stimulus. Agility is an important aspect of many sports and can be improved through specific training drills and exercises.

Anaerobic Training: A type of training that involves short, intense bursts of activity, such as sprinting or weightlifting. Anaerobic training relies on the body's stores of energy, such as ATP and creatine phosphate, and does not require the use of oxygen.

Autoregulation: A training method that involves adjusting the volume, intensity, and/or frequency of a workout based on how the individual is feeling on that particular day. Autoregulation allows for a more personalized and effective training program, as it takes into account the individual's current state of recovery and readiness to train.

Blood Flow Restriction (BFR) Training: A training method that involves reducing the flow of blood to and from a muscle while exercising. BFR training is used to promote muscle growth and strength gains by forcing the body to rely on the restricted muscle for exercise performance, rather than larger muscle groups.

Central Nervous System (CNS): The part of the nervous system that is responsible for controlling the body's movements and functions. The CNS includes the brain and spinal cord and is responsible for sending and receiving signals from the muscles and other organs.

Concentric Contraction: A type of muscle contraction that occurs when the muscle shortens, such as during the lifting phase of a bicep curl. Concentric contractions are used to move a load against gravity.

Concurrent Training: A type of training that involves combining resistance training and endurance training in the same workout. Concurrent training is often used by athletes who need to improve both strength and endurance for their sport.

Eccentric Contraction: A type of muscle contraction that occurs when the muscle lengthens, such as during the lowering phase of a bicep curl. Eccentric contractions are used to control the movement of a load against gravity.

Fascicle: A small bundle of muscle fibers that are surrounded by a connective tissue sheath. Fascicles are grouped together to form a muscle.

Force-Velocity Curve: A graph that illustrates the relationship between the force a muscle can generate and the speed at which it can contract. The force-velocity curve is used to determine the optimal training intensity and volume for a given exercise.

Functional Training: A type of training that focuses on improving the body's ability to perform movements that are relevant to daily life or sport. Functional training often involves exercises that mimic real-life movements, such as squatting, lunging, or pushing.

Glycolysis: The process by which the body breaks down glucose or glycogen into pyruvate and ATP, providing energy for the muscles. Glycolysis can occur aerobically or anaerobically, depending on the availability of oxygen.

Hypertrophy: The increase in size of a muscle due to an increase in the number and/or size of its muscle fibers. Hypertrophy is often a goal of resistance training and can be achieved through a variety of methods, including progressive overload, training to failure, and blood flow restriction training.

Isokinetic Contraction: A type of muscle contraction that occurs at a constant speed, regardless of the force exerted. Isokinetic contractions are used in specialized exercise equipment, such as a Cybex machine.

Isometric Contraction: A type of muscle contraction that occurs when the muscle generates force but does not change length. Isometric contractions are used in exercises such as planking or wall sits.

Load: The amount of weight or resistance used in an exercise. The load can be adjusted to provide a specific training stimulus, such as increasing strength or hypertrophy.

Maximal Voluntary Contraction (MVC): The maximum amount of force a muscle can generate during a voluntary contraction. MVC is used to measure muscle strength and is often used in research and clinical settings.

Motor Unit: A single motor neuron and all of the muscle fibers it innervates. Motor units are responsible for producing muscle contractions and can vary in size and number depending on the muscle and task.

Muscle Fiber: A single elongated cell that makes up a muscle. Muscle fibers can be further divided into type I (slow-twitch) and type II (fast-twitch) fibers.

Neural Adaptation: The changes that occur in the nervous system in response to training. Neural

adaptations include improved motor unit recruitment, increased muscle fiber synchronization, and improved coordination and timing.

Overload Principle: The principle that in order to improve fitness or performance, the body must be subjected to a greater stress or load than it is accustomed to. Overload can be achieved through various means, such as increasing the load, volume, or intensity of a workout.

Plyometrics: A type of training that involves explosive movements, such as jumping or throwing, that are used to improve power and speed. Plyometrics are often used in sports training and can be modified to suit different fitness levels.

Progressive Overload: The gradual increase in the stress or load placed on the body during training. Progressive overload is used to continuously challenge the body and promote adaptation and improvement.

Rate of Perceived Exertion (RPE): A subjective measure of the intensity of a workout, based on how hard the individual feels they are working. RPE is often used in conjunction with objective measures, such as heart rate or power output, to monitor training intensity and progress.

Repetition (Rep): A single continuous movement of an exercise, typically involving a concentric and eccentric contraction. The number of reps performed in a set can vary depending on the training goal and individual's fitness level.

Repetition Maximum (RM): The maximum amount of weight or resistance that can be lifted for a given number of reps. For example, a 1RM is the maximum weight that can be lifted for one rep.

Set: A group of consecutive reps performed without rest. The number of sets performed in a workout can vary depending on the training goal and individual's fitness level.

Specificity Principle: The principle that in order to improve performance in a specific task, the training must closely resemble that task. Specificity can be achieved through various means, such as using similar movements, loads, and intensities.

Strength: The ability of a muscle or group of muscles to generate force. Strength can be improved through resistance training and is often a goal of sports training and rehabilitation.

Supercompensation: The temporary increase in fitness or performance that occurs after a period of training and recovery. Supercompensation is the result of the body's adaptation to the training stress and is used to optimize training intensity and volume.

Time Under Tension (TUT): The duration of time that a muscle is under tension during an exercise. TUT is often used to manipulate the training stimulus and can be adjusted by changing the load, reps, or tempo of the exercise.

Training Frequency: The number of training sessions performed in a given time period. Training frequency can vary depending on the individual's fitness level, training goal, and recovery ability.

Training Intensity: The level of effort or exertion required during a training session. Training intensity can be measured objectively, such as through heart rate or power output, or subjectively, such as through rate of perceived exertion.

Training Load: The total amount of