

THE FUNDAMENTALS

OF STRENGTH AND CONDITIONING

COACH



**STRENGTH AND
CONDITIONING**
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INTRODUCTION



Thanks for downloading our Fundamentals of Strength and Conditioning e-Book.

This document delves into what a strength and conditioning coach does and the skills they need to excel.

- What is S&C?
- The Role of an S&C Coach.
- Intro to the BIG 8 Pillars of S&C.
- Programming & Periodization.
- Training Principles.
- Warming Up.
- Components of a Warm-Up.
- Strength Training.
- The BIG 8 Human Movements.
- Ballistic Training.
- The Force-Velocity Curve.
- Olympic Weightlifting.
- Phases of the Lifts.
- Plyometrics.
- Plyometric Considerations.
- Speed & Agility.
- Commands.
- Metabolic Conditioning.
- The 3 Energy Systems.
- Have you got what it takes?
- Stay Social.
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WHAT IS S&C?

Strength and conditioning is the physical development of competitive athletes.

As a strength and conditioning coach, your job is to design and deliver training that elicits the greatest performance.

This skillset is essential for elite-level sport, grassroots players and hobbyists who want to succeed in sporting and fitness events.





THE ROLE OF AN S&C COACH

Roles:

- Use exercise prescription to improve performance in athletic competition.
- Develop all the components of fitness - not just strength training.
- Prevent athletes from getting injured.
- Teach athletes proper technique and movement mechanics.
- Help athletes return to play when injured – reconditioning.
- Work with other support team members to achieve all of the above and more!





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THE BIG 8 PILLARS OF S&C



The SCC Academy classifies 8 main specialisms that are essential skills for S&C coaches.

Upon completion of all 8 specialisms, you can apply to gain your SCCA Badge.

- Programming & Periodization.
- Warming Up.
- Strength Training.
- Ballistic Training.
- Olympic Weightlifting.
- Plyometrics.
- Speed & Agility.
- Metabolic Conditioning.





PROGRAMMING & PERIODIZATION



Having a good plan is fundamental to success, and this is where Programming & Periodization comes in.

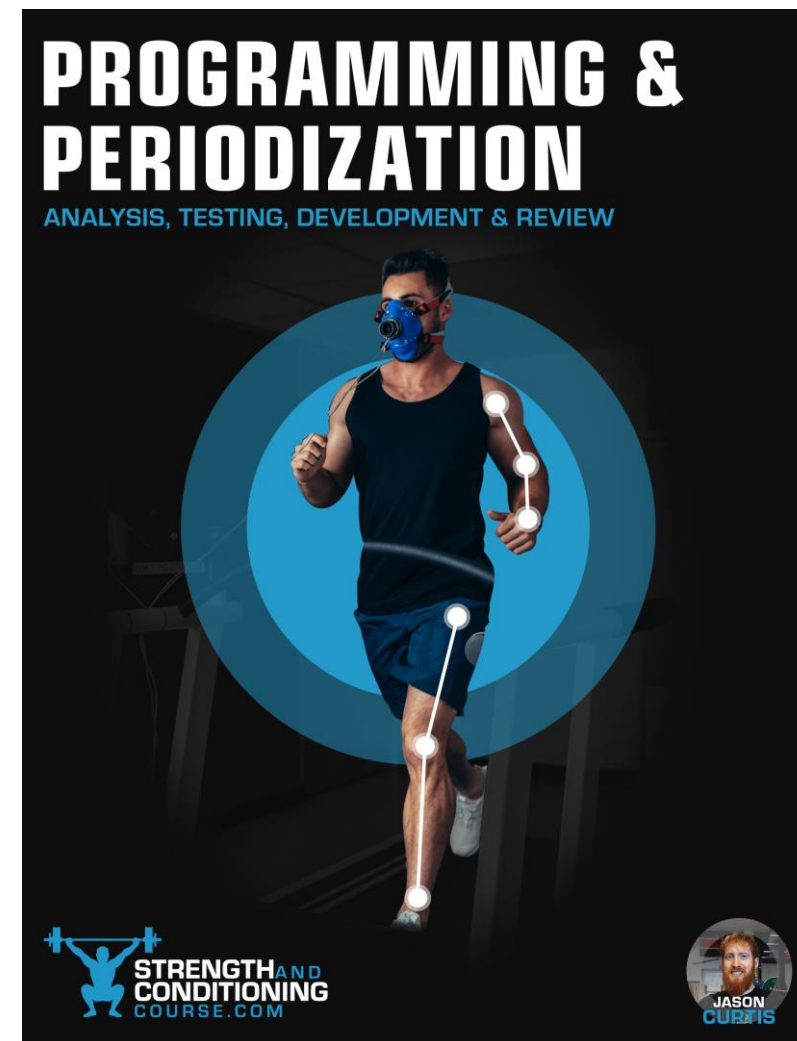
Yes, athletes can achieve huge success with a little hard work and a lot of consistency. However, there is no doubt that we benefit from taking a systematic approach to long-term development.

No plan is perfect simply because there are too many variables. However, we aim to create an optimal plan in the given time and environment - these plans are live documents that are continually reviewed and developed.

Although no plan is ever perfect, we aim to get as close to perfect as possible!

Periodization: The systematic development of progressive cycles or blocks of training that aim to elicit peak performance at a specific time (competition).

Programming: The development of the training sessions within these cycles or blocks.





TRAINING PRINCIPLES

The table below shows the training principles that underpin all physical development.

Training Principle	Description
Individuality	Everyone responds to training differently. Some need more volume, while others need more intensity.
Specificity	Any changes or adaptations the body makes will be specific to the stress or stimuli it is exposed to. This is often described as the SAID principle (Specific Adaptation to Imposed Demands).
Adaptability	Over time the body becomes accustomed to the stress or stimuli it is exposed to and, therefore, improves in several ways (specific to the stress), which is a good thing. However, we must also consider the law of accommodation, which states that our response to a constant stress will decrease over time. Therefore, we need to ensure our training is progressive and doesn't plateau (cease improving).
Overload	In order to elicit adaptations, the body must be put under additional stress (overloaded).
Progression	The additional stress that we put on our bodies to elicit adaptations needs to be progressive and gradually increased.
Recovery	The body needs time to repair. We need to overreach where possible to elicit the most results, but if we overreach too far and too often, we will overtrain, resulting in injuries and illness, etc.
Reversibility	If stressors are taken away, or sufficient recovery isn't allowed, performance levels can be lost.



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WARMING UP



A warm-up prepares you for the activity at hand, both physically and psychologically. It should get you ready to perform at your best and reduce your risk of injury – a warm-up usually lasts between 10-20 minutes.

Warm-ups often involve just a few practice movements at moderate intensity before performing the main activity. However, we want to delve deeper into optimizing the warm-up protocol to minimize our risk of injury and maximize our performance in the subsequent session.

We also want the warm-up to act as a vital part of the session where various physical attributes are developed long-term.

An athlete might spend as much as 1-2 hours a week warming up, which equates to 50-100 hours per year. Therefore, this time should be put to good use – It's not just about raising your heart rate and getting your muscles warm; it's about producing an aspect of the session that is developmental for the athlete (both movement and skill development).

WARMING UP
BUILD MOVEMENT, MAXIMIZE PERFORMANCE & MINIMIZE YOUR RISK OF INJURY

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COMPONENTS OF A WARM-UP

1. General Warm-Up:

- low intensity period of 5 to 10 minutes of activities such as jogging and skipping. Can be made more sports-specific by introducing a ball.
- Aim – increase heart rate, blood flow, deep muscle temperature, respiration rate, perspiration, and decrease viscosity of joint fluids.

2. Specific Warm-Up:

- Incorporates movements similar to those that will occur during practice.
- Includes 8–10 minutes of dynamic stretching that focus on moving through ROM seen in sport.
- Follows specific movements of increasing intensity associated with the sport, for example, sprint drills or a variety of jumps.
- The greater the need for power in the sport, the more important the warm-up becomes.

(Baechle and Earle, 2008)





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STRENGTH TRAINING

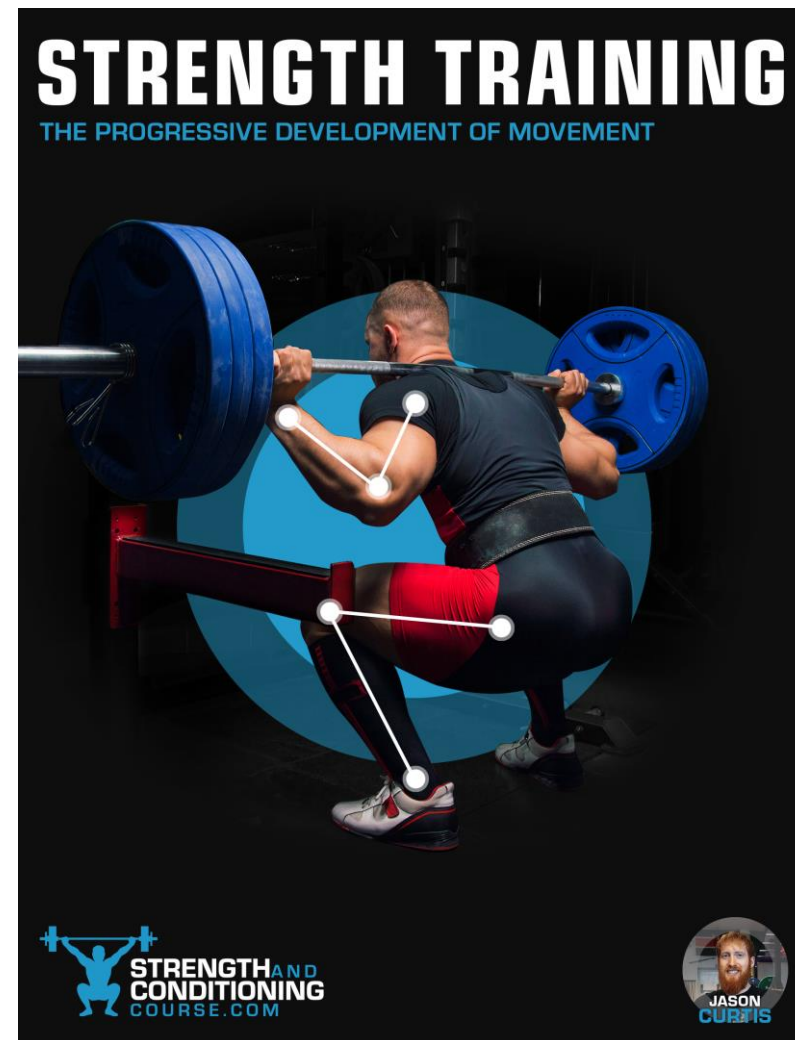


The development of strength is the foundation of physical performance because, before all else, you need the strength in your structures to support the fundamental movements that you carry out each day.

Your strength training starts as you develop the neck strength to hold your head up and learn to crawl and walk as a baby. In essence, every move you make develops strength. However, the law of accommodation soon sets in. In short, you accommodate to the stressors placed on your, and therefore, adaptations cease.

Of course, you can increase the complexity of bodyweight exercises and perform advanced calisthenics. However, the easiest way to elicit overload and stimulate adaptations is to add external resistance, aka resistance training or strength training.

Ultimately, strength training is simply the process of progressively adding resistance to the BIG 8 Human Movements.





THE BIG 8 HUMAN MOVEMENTS

There are 7 basic human movements and 1 precursor – The BIG 8:

- **Brace:** The ability to create tension and maintain a position. Bracing is a vital part of maintaining posture both statically and dynamically.
- **Hinge:** Bending at the hips while keeping the knees straight and maintaining a neutral spine.
- **Squat:** Bending at the hips, knees and ankles while maintaining a neutral spine.
- **Lunge:** Single leg exercises which work the legs independently from one another (unilateral).
- **Push:** Pushing with the upper body.
- **Pull:** Pulling with the upper body. The deadlift exercise is often categorised as “Pull” (pulling from the floor). However, the deadlift can be better categorised as a hinge exercise as the emphasis is on hip extension.
- **Rotate:** Rotation is primarily performed at the hips and shoulders (ball and socket joints) and at the spine through a series of facet joints. These structures can work in isolation or together to produce larger rotational actions.
- **Gait:** Walking, running and carries.



BALLISTIC TRAINING



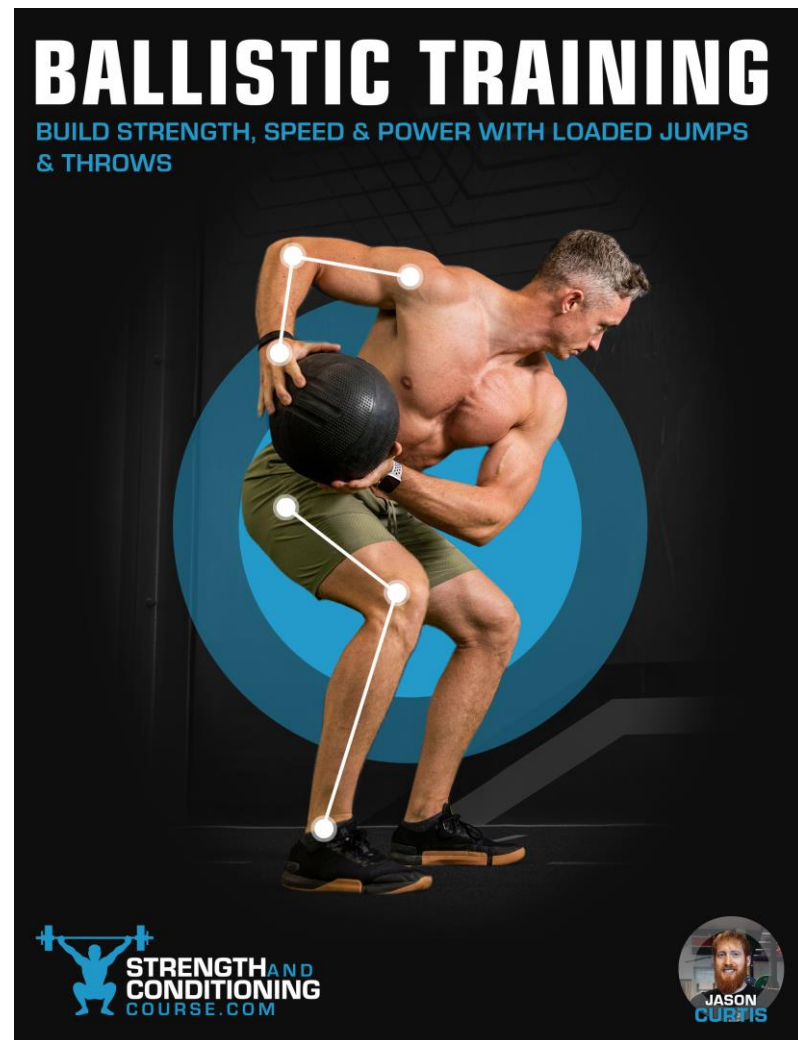
Ballistic training is an explosive and powerful form of training that uses jumps, throws, and strikes to accelerate through the concentric action to produce maximal power continually.

During ballistic training, an athlete's body or an external object is explosively projected into flight – the term ballistic comes from a Greek word that means “to throw.”

The term explosive strength is often used interchangeably with power. However, we can produce force explosively with no change in muscle length and, therefore, no joint action. Whereas power is a measure of work, requiring the production of high force at speed to jump higher, throw further, or strike harder.

Force (Strength) x Velocity (Speed) = Power

Ballistic training can be performed with low, moderate, or high loads. Athletes must work within each area of the Force-Velocity Curve to ensure optimal development in each area. However, ballistic training is most commonly performed with moderate loads around the Speed-Strength zone.





THE FORCE-VELOCITY CURVE

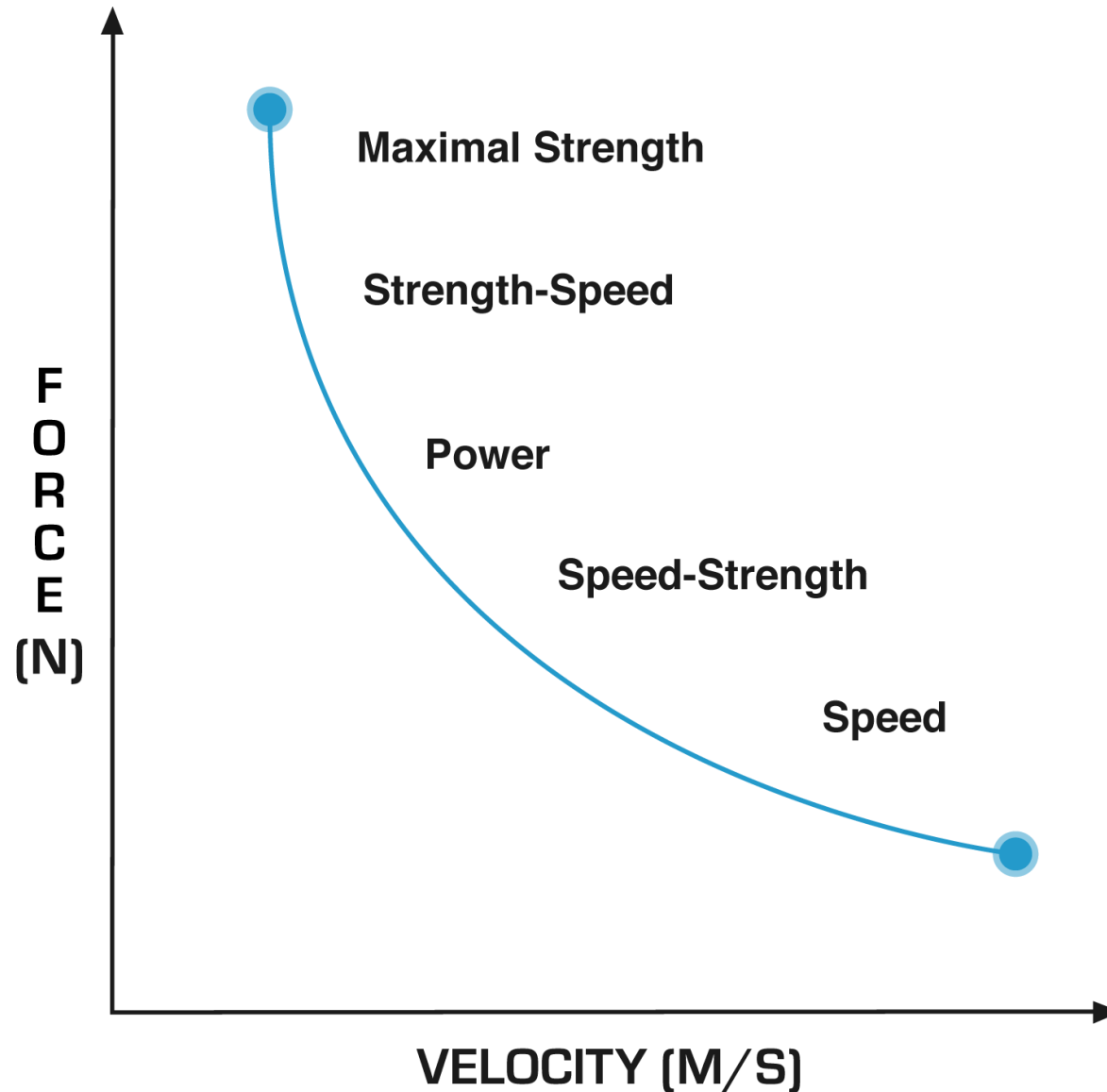
Training needs to be specific to the athletes' needs and goals.

SAID Principle: Specific Adaptations to Imposed Demands.

Certain performance qualities will take the primary focus, and we must consider how too much of a specific type of training may negatively impact another quality.

However, strength athletes (Powerlifters) will benefit from getting faster, speed athletes (sprinters) will benefit from getting stronger, and all athletes will benefit from increasing their work capacity. All qualities need to be developed. It's a matter of to what degree.

Athletes should work along the curve and develop the key qualities that will boost overall performance.





OLYMPIC WEIGHTLIFTING

Olympic weightlifting involves 2 lifts, the Snatch and the Clean & Jerk. Both are performed with a barbell and weight plates.

The snatch uses a wide grip and is a one-part lift (floor to overhead), whereas the clean & jerk uses a narrower grip and is a two-part lift (floor to shoulders, shoulders to overhead).

In competition, the lifter has 3 attempts at each lift (snatch and then clean & jerk). The total of the two highest successful lifts determines the overall result within a bodyweight category – a Sinclair Total uses a coefficient to compare totals across different weight categories.

Olympic weightlifting is not just a test of strength. It also requires incredible speed, power, coordination, stability, and mobility. Therefore, it is not only an incredibly intricate and impressive sport but also a brilliant tool used by strength and conditioning coach's to maximize their athlete's physical development.





PHASES OF THE LIFTS

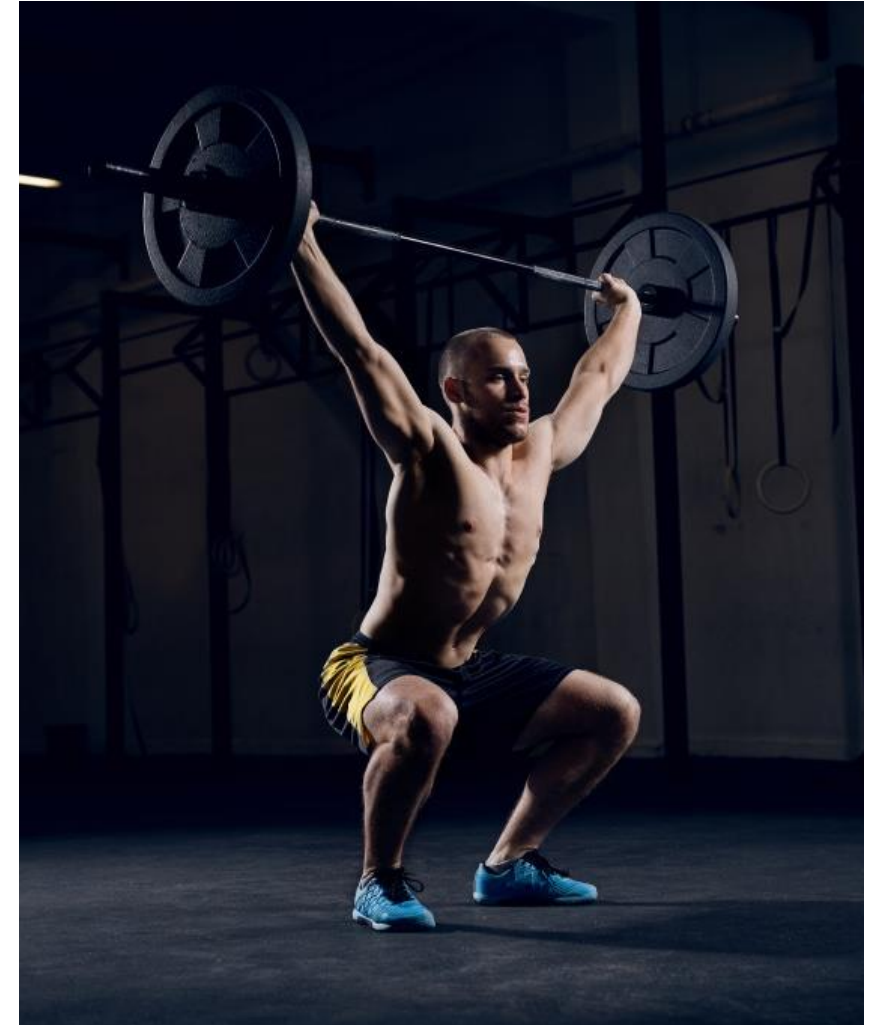
The Olympic lifts can be categorized into 6 phases:

The Snatch & Clean Phases:

- The Starting Position.
- The 1st Pull.
- The 2nd Pull.
- The 3rd Pull.
- The Receiving Position.
- The Recovery.

The Jerk Phases:

- The Starting Position.
- The Dip.
- The Drive.
- The Push Under.
- The Receiving Position.
- The Recovery.





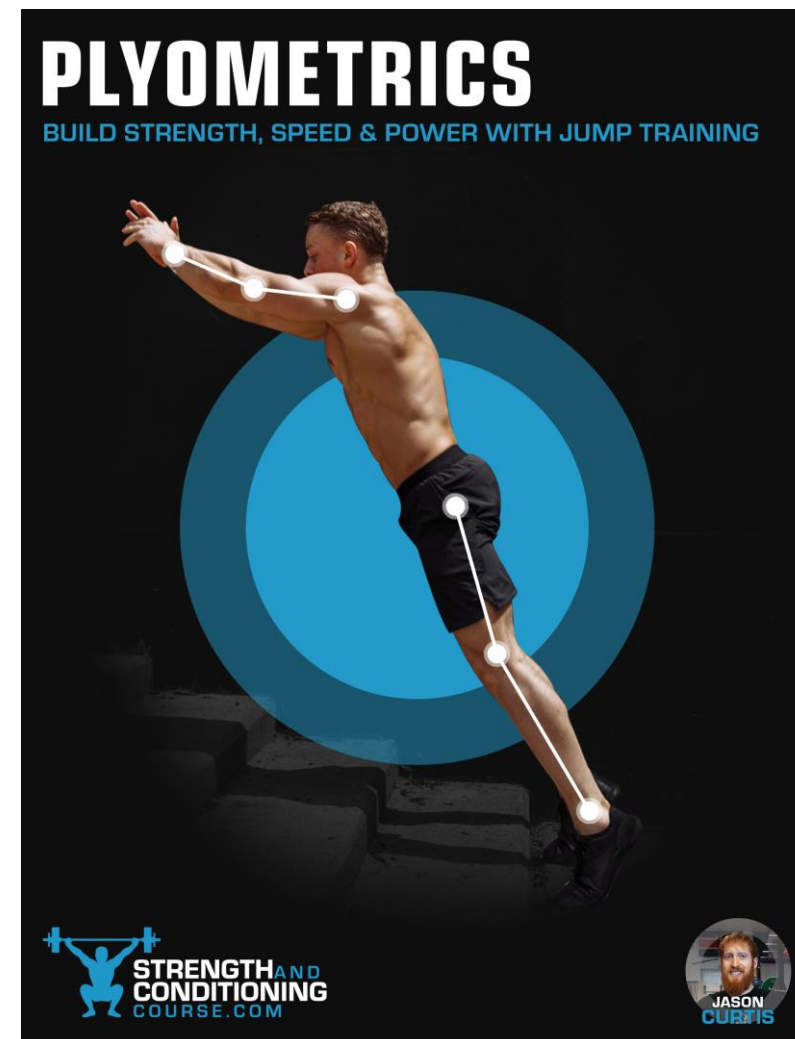
PLYOMETRICS

Plyometrics (Plyos) involve explosive exercises where the emphasis is placed on utilizing the stretch-shortening cycle (SSC – the “pre-stretch that allows us to produce more force and power). This is most commonly practiced using a wide variety of jumps, bounds and hops.

The term “Plyometrics” was coined by Fred Wilt (an Olympic long-distance runner), who came up with the term after watching Russian athletes using a variety of jumps in their warm-ups prior to track and field events.

The 3 Phases of Plyometrics:

- **Eccentric Phase:** A countermovement is performed where the prime mover(s) (agonists) is stretched (lengthened).
- **Amortization Phase:** This is the phase between the eccentric and concentric phase and should be as short as possible to capitalize fully on the SSC.
- **Concentric Phase:** The fibres of the prime mover(s) are shortened.





PLYOMETRIC CONSIDERATIONS

The below table explains considerations that should be taken when selecting plyometric exercises.

Consideration	Description	
Ground Contact Time	Longer Contacts – Higher Force	Shorter Contacts – Lower Force / Greater Reactive Strength
Ankle vs Hip Dominant	Ankle Dominant – Sprinting	Hip Dominant – Jumping
Loaded vs Unloaded	Loaded – Increased Contact and Force	Unloaded – Decreased Contact and Force / Greater Reactive Strength
Bilateral vs Unilateral	Bilateral – Jumping	Unilateral – Sprinting, Bounds, Hops
Training Phase	Further from Peak – General	Closer to Peak – Specific



SPEED & AGILITY



When it comes to athleticism, being fast and agile is at the top of the list.

Speed is the ability to move the body in one direction as fast as possible, for example, a 100m sprint.

Agility is often referred to as the ability to change body position or direction effectively. For example, sprinting 5m to a cone, turning 180 degrees, and sprinting 5m back to the start line. However, “closed drills” that involve running through a series of pre-set cones are technically a measure of Change of Direction (COD) speed.

Quickness is the ability to react to a stimulus (reactive ability) and change body position with a maximum rate of force production. For example, catching a ball which is thrown to your far left.

In sport, agility is a combination of quickness and COD, with agility defined as a change in velocity, body position, or direction in reaction to stimuli. This can be trained using “open drills”, for example, moving a certain way around a cone in response to a stimulus that becomes present mid-drill.

SPEED & AGILITY

REACT QUICKLY, CHANGE DIRECTION EFFICIENTLY &
ACCELERATE MAXIMALLY





COMMANDS



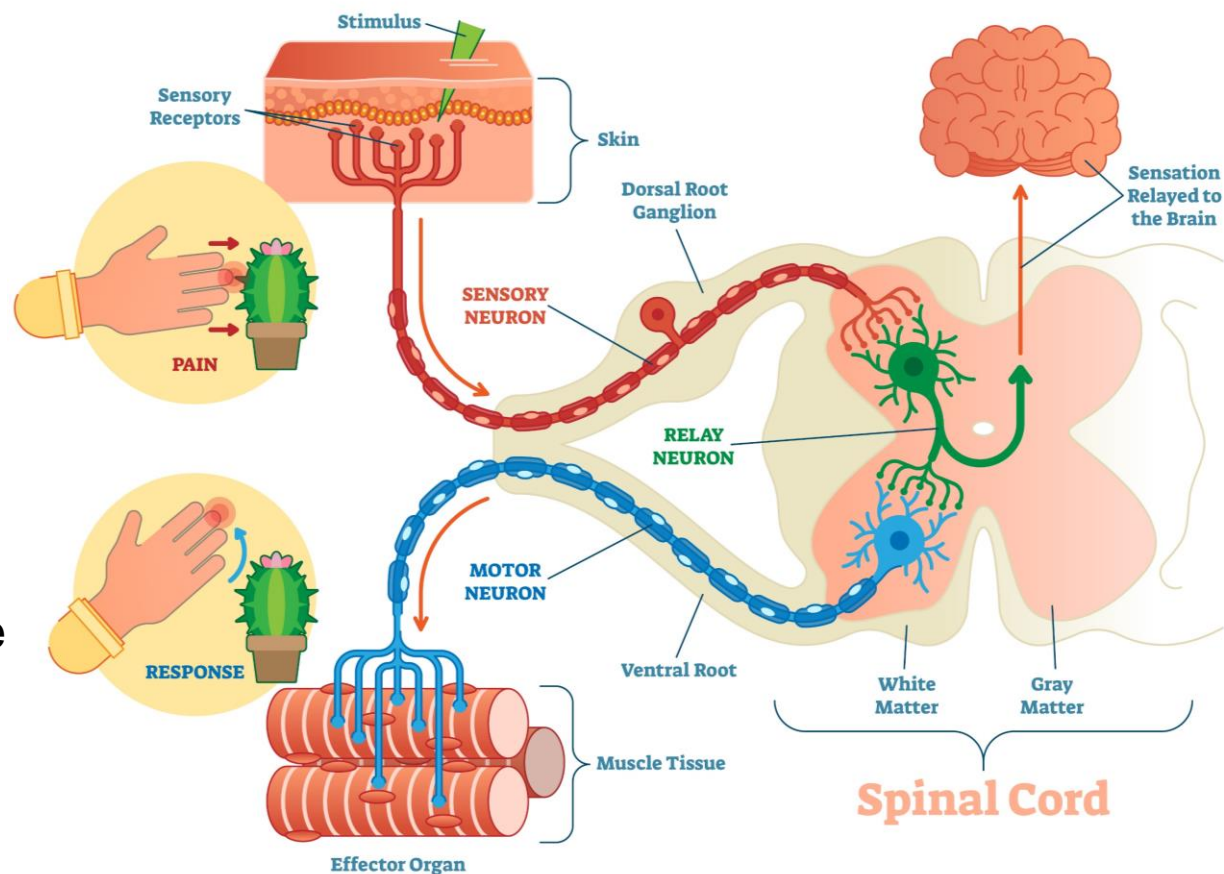
We can use a variety of command signals to create stimuli for the athletes to respond to, and these come in 3 major types:

- **Audible (Sound):** For example, 3-2-1 Go!
- **Visual (Sight):** For example, raising one arm.
- **Kinesthetic (Tactile/Touch):** For example, tapping an athlete on their shoulder.

We tend to respond to kinesthetic the fastest, then audible, and finally visual – these commands can be used to both start the drill and mid-drill to increase the reactive element.

The diagram illustrates how our nervous system reacts to stimuli using sensory receptors. This is involuntary when we touch a hot plate, for example, and is incredibly fast. However, when we incorporate the process of viewing an action (sensory input), our brain processing the information (integration) and sending a signal in response (motor output), this is still fast, but not as fast.

REFLEX ARC





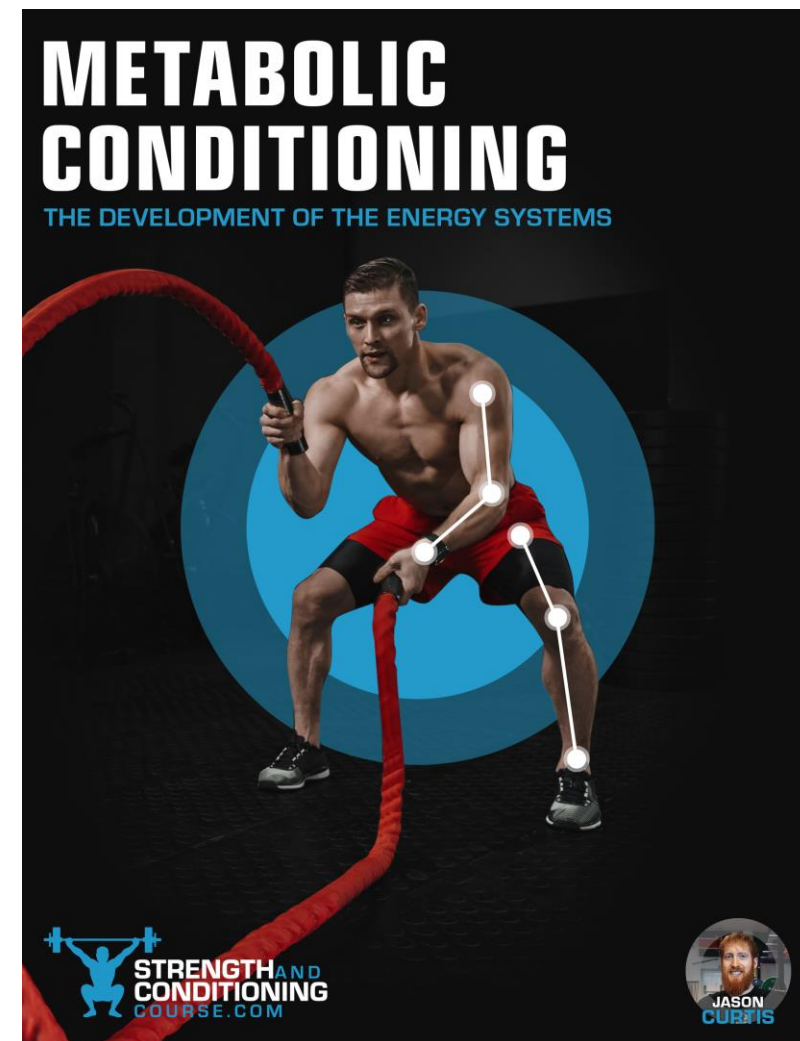
METABOLIC CONDITIONING

Metabolic conditioning refers to the development of the 3 energy systems. However, the term is often used to brand high-intensity fitness, with “metabolic finisher” referring to a short, high-intensity workout at the end of a training session. However, a long steady state run is metabolic conditioning.

The term “energy system” (bioenergetic systems) refers to metabolic processes (chemical processes) that create energy in the body. These energy systems produce energy at different speeds (power) for varying durations (capacity), and therefore, training can be tailored to target each system specifically.

Some sports emphasize the energy system that provides the energy the fastest, such as track and field events like the shot put, while others require all 3 in varying amounts, such as boxing or football.

Sports will often have a bias towards one energy system like a marathon runner, or that bias may change depending on the sporting situation.





THE 3 ENERGY SYSTEMS

The 3 Energy Systems:

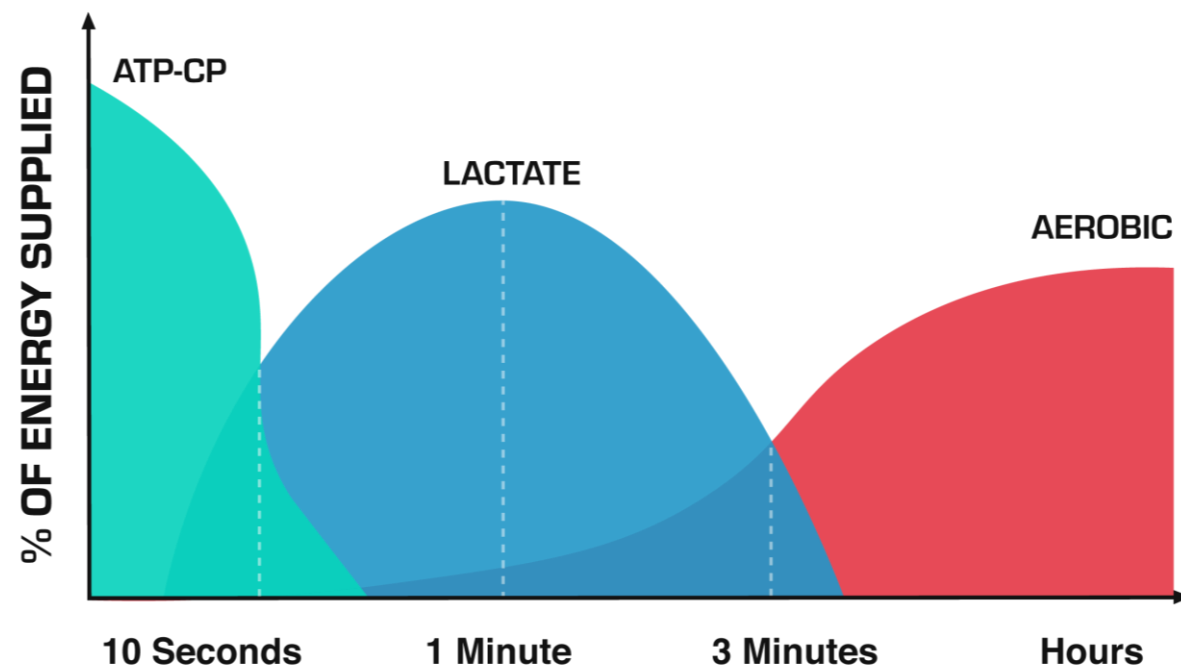
- ATP-CP (Alactic) System.
- Lactate System.
- Aerobic System.

Anaerobic refers to a metabolic process that is completed without the use of oxygen. Whereas aerobic refers to a metabolic process that uses oxygen.

- The 1st energy system is anaerobic but doesn't produce lactate.
- The 2nd is also anaerobic but produces lactate.
- The 3rd energy system uses oxygen, hence aerobic.

The aerobic system is the most adaptive, and the ATP-CP (alactic) system is the least.

The lactate system produces fatiguing waste products, while the other 2 do not.





HAVE YOU GOT WHAT IT TAKES?

Have you got what it takes to become a strength and conditioning coach?

Our tagline is “Become the Expert” because that is precisely what you need to be.

Being an expert is an ongoing project. You must throw yourself into learning the theory and mastering the practical skills.

Each of the 8 specialisms is a crucial tool within a strength and conditioning coach’s toolbox, and you must have a deep understanding of each.

At the SCC Academy, we make comprehensive content accessible. We break it down and make the learning systematic.

For those on the Level 4 Certificate in Strength and Conditioning, we also make sure you get as much face-to-face learning with your tutor – practice, practice, practice!





STAY SOCIAL

Thanks for downloading our Fundamentals of Strength and Conditioning eBook, I hope you have found it useful, and remember, being an expert is an ongoing process, we have barely scratched the surface here!

If you love this kind of content and all things strength and conditioning, please follow our social media pages – I post new content daily to both Facebook and Instagram.

Here are the links below:

Facebook: <https://facebook.com/strengthandconditioningcourse>

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Please don't hesitate to drop me a message on either feed if you have any questions at all.

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