

BCA Strength Training Guide

Breakaway Coaching and Analytics



Introduction

Strength training is included in all BCA training programmes due to benefits/performance gains that can be made. Strength work is designed to complement training by adding additional adaptations without causing excessive fatigue.

strength and conditioning + hypertrophy # 1

0:30:00

-- km

13 TSS

Upload

Analyze

Warm Up

Main Set

Cool Down

Build Workout

Planned

Completed

Duration

0:30:00

h.m.s

Calories

kcal

TSS

13

TSS

IF

0.50

IF

Min

Avg

Max

Heart Rate

bpm

Description

FOCUS: Hypertrophy training to increase the size of type 1 muscle fibres. Exercises are completed between 50-75% of 1 Rep Max. The speed of contraction is 3 seconds down and 3 seconds up. Before each starting each exercise complete a warm up of 5-10 reps @ 10% 1 rep max.

Please feel free to change, adjust or add exercises that suits you best or for variation. You are not expected to complete all the exercises. Just finish the most you can (without rushing) in the prescribed time.

warm up.

- foam rolling
- resistance band

mainset - core:

- plank = 20-60 secs x 2-3 sets
- side plank = 15-45 secs x 2-4 sets*
- single leg glute bridge = 6-8 reps x 2-4 sets

mainset - lower body: 8-12 reps x 2-6 sets:

- lunges
- squats
- bulgarian squat
- single leg squat

mainset - upper body: 4-6 reps x 2-3 sets:

- press ups
- renegade row

* 1 set = 1 side, therefore, 4 sets = 2 sides each.

☒ Automatically calculate planned values

Delete

Cancel

Save

Save & Close

The above screenshot is an example of the strength workouts provided. As everyone is different the workouts have been designed so you have freedom to select the exercises or weights (within prescribed ranges) that suite you best. Please note that completing an exercise one side equals one set. For example, if you have to do side plank for 6 sets it would be equal to 3 each side.

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Workout Exercises.....Error! Bookmark not defined.

Core Stability.....Error! Bookmark not defined.

Lower Body.....Error! Bookmark not defined.

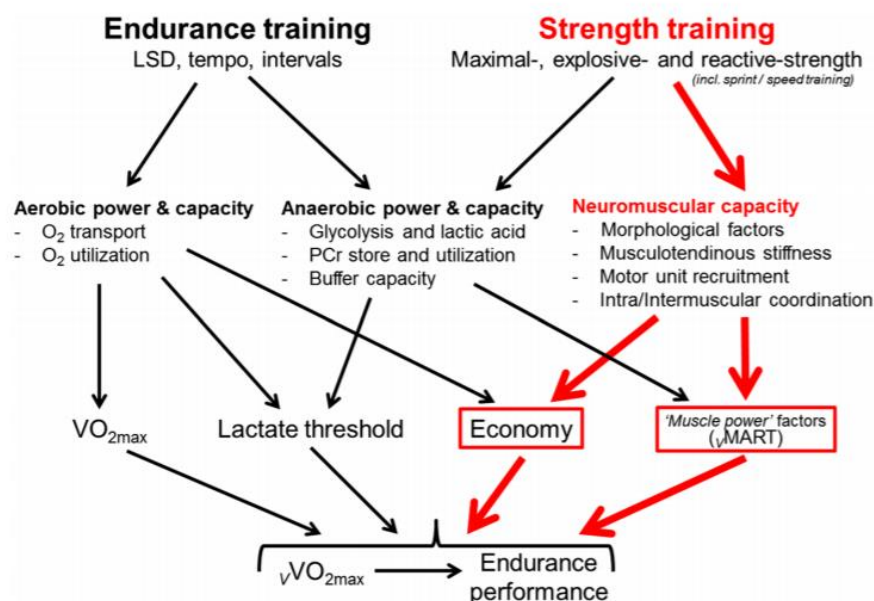
Upper Body.....Error! Bookmark not defined.

Summary.....Error! Bookmark not defined.

Performance Gains

Strength training (ST) can result in performance gains as high as 34% in elite and non-elite athletes. ST also enhances performance across types of events (long- or short) and sports (marathon runners to cyclists). Effects of ST range from improved nervous system and bone health.

Furthermore, ST in the context of endurance sport is the ability of the neuromuscular system to provide a sustained force for a prolonged period. The below flow chart provides an overview of how strength training is incorporated in terms of the adaptations.



Testing

If you do not know your 1 rep max, complete the following test a week before the programme or in the first hypertrophy workout. If you are an intermediate masters or below (does not include normal intermediate) use the below equation to find your 1 rep max.

As completing a 1 Rep Max can be unsafe and does not related to specific movement in endurance sport. Consequently, the following test is far more realistic to the training that is planned during the programme.

Step 1: Complete a 10-minute graded exercise warm up (from zone 1 – zone 4), followed by foam rolling for 10 minutes. Before each exercise complete a warmup set between 5 and 10 reps for each exercise.

Step 2: Use a weight hard enough that you cannot complete any more than 7-10 reps for the following exercises: squats, lunges, deadlift, leg press and bench (not necessary for cyclists and runners). Cool down ~ 10 minutes bike + 10-15 minutes stretching.

Step 3: Once you have the results use the below equations to calculate your 1 rep max. Use the strength training zone percentages (in above section) to what weight ranges are required for each phase.

Untrained: (< Intermediate Masters)

$$1RM (kg) = 1.554 \times 7 - 10 RM \text{ weight } (kg) - 5.181$$

Example:

$$1RM (kg) = 1.554 \times 32 (kg) - 5.181$$

$$1RM = 44.7 \text{ kg}$$

Trained (Intermediate >)

$$1RM (kg) = 1.172 \times 7 - 10 RM \text{ weight } (kg) + 7.704$$

Example

$$1RM (kg) = 1.172 \times 70 RM \text{ weight } (kg) + 7.704$$

$$1RM = 89.7 \text{ kg}$$

Please use this space to write your 1RM:

#	Phase	%	Min Weight	Max Weight
1	Hypertrophy	50-70		
2	Strength En	60-80		
3	Power	15-40		

Alternatives

Circuit Training

Circuit training builds an endurance and improves recovery time while increasing strength. The movements completed however, must be specific to your sport and completed at max effort. Below is an example workout.

Set 1.

Plank ----- 30 secs + 30 secs rest

Russian Twists ----- 30 secs + 30 secs rest

Press Ups ----- 30 secs + 30 secs rest

Burpees ----- 30 secs + 30 secs rest

Squats ----- 30 secs + 30 secs rest

Lunges ----- 30 secs + 30 secs rest

Repeat x 3.

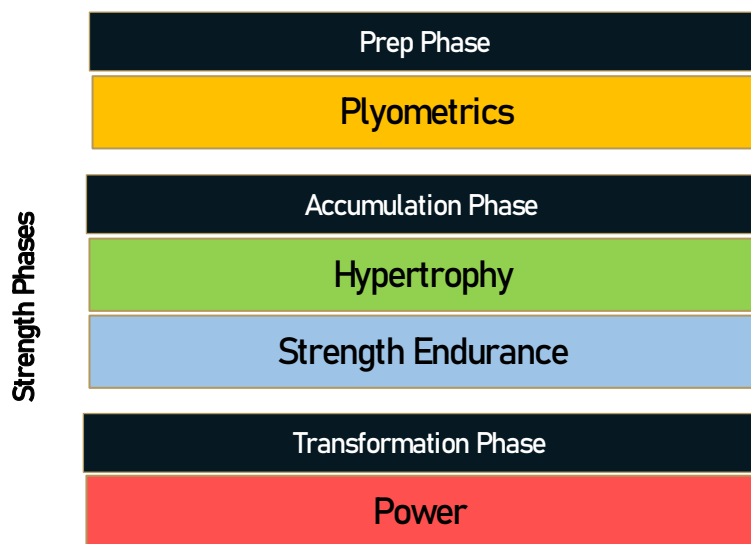
During the accumulation phase the 'on' should increase by 5 seconds every 1-2 weeks – while keeping the rest period (off) the same. Progressively, during the Transformation phase the rest period should decline to promote higher intensity. Example of this progression is below:

#	Phase	Workout
1	Accumulation	30 seconds on: 30 seconds off
	Accumulation	35 seconds on: 30 seconds off
	Accumulation	40 seconds on: 30 seconds off
2	Transformation	35 seconds on: 20 seconds off
	Transformation	35 seconds on: 15 seconds off
	Transformation	35 seconds on: 10 seconds off

Periodisation

Strength training follows a periodised structure throughout every programme. Concurrent training can often lead to an interference with respect to adaptations. Therefore, strength workouts match the adaptations that occur within the phase of training and sport. For example, both endurance and hypertrophy strength training causes type I muscle fibres enlargement. As a result, hypertrophy training is often implemented when training focuses on endurance work.

The aim of a periodised plan is to ensure an athlete is at the best for their A-priority event/s. The strength phases co-inside with the type of training that takes place. For example, during the transformation phase event specific intervals are planed, this often results in highly powerful efforts therefore, power strength training is planned simultaneously. Each strength workout provides you with a group of strength exercises. However, please refer to the strength exercises guide and the YouTube channel for a visual reference to strength training. Below is an example outline of strength training season.



Plyometrics

Plyometrics is defined as rapid stretching of a muscle(s) followed by the shortening of a muscle(s) during rapid contraction. Plyometrics can result in performance gains as high as 3.9% and has an assortment of benefits including the ability to generate an explosive contraction in a short space of time. The optimum ranges when completing plyometrics are in the box below (SOC – Speed of Contraction).

Ranges

3-8 reps | 3-6 sets | Body Weight | SOC: 2-1

Typically, plyometrics is best for sports that require explosive power such as volleyball. However, there is evidence suggesting there is a positive effect for endurance performance. Plyometrics increases endurance performance by improving musculotendinous stiffness (the relation between eccentric, isometric and concentric contraction) which improve exercise economy (using less oxygen for more power/pace). This has been shown in short to middle distance runners to increase by 2.7%.

It is important to note that adding weights when competing plyometrics has no additional benefit. Furthermore, a work rest ratio of 1:5 (1 minutes 'on' – 5 minutes 'rest') is required to complete the movements at max effort, and 48-72 hours rest between workouts is optimal.

Furthermore, athletes who do not have access to the gym or weights, this type strength work (combined with circuit training) would be a good replacement

Adaptions of plyometrics training included a decreased ground reaction time (meaning distances per step when running increases, due to the increased power per step). Increase recruitment of motor units, resulting in better reactiveness to exercise and improved storage of elastic strain energy.

Hypertrophy

Muscle fibre size can change in just three weeks' worth of hypertrophy training (HT) and is defined as the enlargement of muscle fibres. Current periodisation literature shows HT is best during the initial cycle of the first phase in the season (the accumulation phase # 1), as HT supplements aerobic endurance training with similar adaptations. Training of this nature causes greater gain in fast twitch muscle fibres than in slow twitch fibres.

Hypertrophy

8-12 reps | 2-6 sets | 50-70% Rep Max | SOC: 3-3

HT is important for endurance athletes however, even more so for athletes 35 years of age and over. As this is when muscle mass begins to decline and by the age of 80 years 50% of muscle fibres would be disappeared. Therefore, in master athletes the aim is to decrease the rate of decline. Master athletes who compete ST and endurance training increase maximum strength by 22% (1% higher in those that just complete strength). Furthermore, fast twitch fibres improve most through ST than sport specific sprint training.

Although it is important to be consistent with training, de-training for a short time (< 3 week) does not result in decreases in muscle hypertrophy (size), instead may even result in an improved hypertrophy when returned to training. Evidence is suggesting a higher number of muscle fibres that activate the greater the muscular responses, hence the high number of reps.

Adaptations that occur as a result of HT is enlargement of slow twitch muscle fibres. In addition, HT is best for muscular endurance-based sports such as rowing or sprint cross country skiing for example.

Strength Endurance

Strength Endurance (SE) is a form of strength and condition which works on increasing muscular endurance and requires heavy contractions for longer periods of time. Technique of exercises when completing SE must be high otherwise the probability of injury increases. SE training is introduced when HIIT (High Intensity Interval Training) is introduced (in a 20-week programme this may be week 3-5, or in a 6 weeks programme this would be from week 1).

Strength Endurance

12-15 reps | 2-3 sets | 60-80% Rep Max SOC: 2-1

When completing SE training it is critically important to not go over the sets count (3 sets max) as this leads to fatigue/DOMs (delayed on-set muscle soreness) and increased lean muscle mass (weight without fat). Endurance sports rely on a high power to weight ratio, therefore, keeping weight the same or down while increasing strength is the main aim of SE.

Adaptions that arise as a result of SE include improved neuromuscular fatigue. Meaning the ability/duration one can performance exercise at high intensity/maximum anaerobic contraction increases. Increased thickness of the Myosin Heavy Chain (MHC), which are proteins of muscle filaments.

Power Training

Power Training (PT) focuses on overcoming a resistance in the shortest possible time. PT works on exercises such as jumping with weight with the aim of increasing the acceleration phase of contractions.

Power

3-5 reps | 4-5 sets | 15-40% Rep Max | SOC: 3-1

Novice/beginner athletes who are less familiar with strength training improve more when completing high reps but lower weight. On the other hand, the opposite is the case for advanced athletes who improve more with high weight but lower reps. The practical applications of this are simple. Athletes with less experience should complete the strength training (in all phases/types) in the low end of the percentage of 1 Rep Max but the high end of the rep range, and visa versa for advanced athletes.

By the Transformation phase Training Intensity Distribution (TID) is often as polarized as 50%-0%-50% and equally the strength training matches the adaptations. Power training is a step down from strength endurance work, as these workouts focus on less reps and weight. If the weight you are using does not allow you to complete a maximum contraction effort lower the weight.

Adaptions that occur as a result in this include increased function in fast twitch fibres (which is still an advantage despite endurance athletes rely predominantly on slow twitch fibres due to the increase fibre requirement).

Summary

Thank you for taking the time to read the BCA nutrition guide. Please provide feedback to BCA regarding this document or the programme in general using the link below. Mentioned earlier in the introduction, if you would like your nutritional intake analysed get in touch you will receive a 10% discount. Details of this service include:

- Review of food diary
- Assessment of nutritional requirements
- Analysis of macronutrient intake.
- Implications of data
- Future fuelling strategies
- Supplementation requirements
- Nutrition and training data comparison

Feedback Link:

Clicking the button will re-direct you to a google form which should take < 3 minutes to fill in.

Questionnaire