HSBC UK BRITISH CYCLING
GREAT BRITAIN CYCLING TEAM

GBR

BRITISH CYCLING BASICS

Strength and Conditioning Framework

Regional Schools of Racing

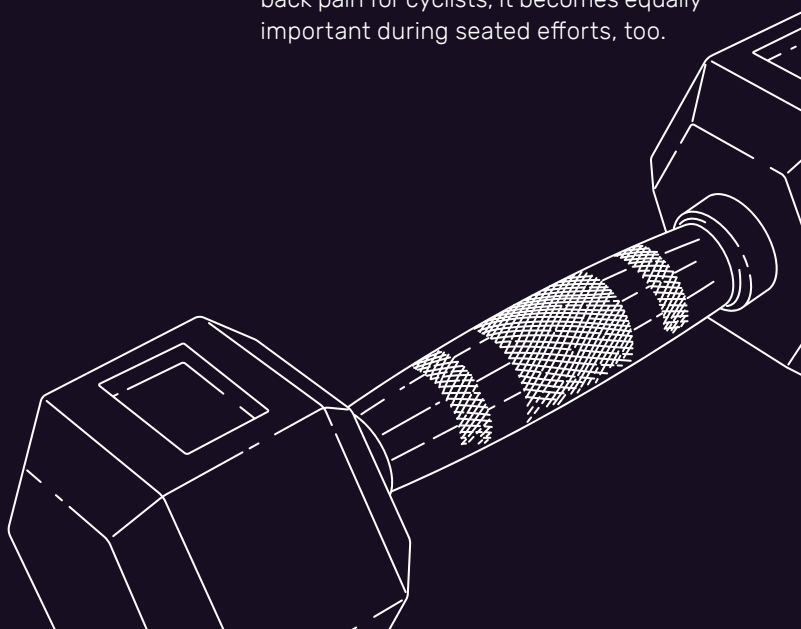
HSBC UK LOTTERY FUNDED uk sport cervélo

REGIONAL SCHOOLS OF RACING

THE ROLE OF STRENGTH AND CONDITIONING

The role of the S&C within endurance cycling is to provide the strength and power required to get off the line in a standing start. We also want to increase the ceiling of force production so that higher relative powers may be sustained for longer for endurance riding.

Force production will come mainly through the lower limbs to the pedals but will also need to be transferred from the legs to the handle bars through the trunk and the upper body. A strong and stable upper body and trunk are a necessity to ensure this, especially during the start but because of the large volumes of time spent in a demanding aerodynamic position, and the prevalence of lower back pain for cyclists, it becomes equally important during seated efforts, too.



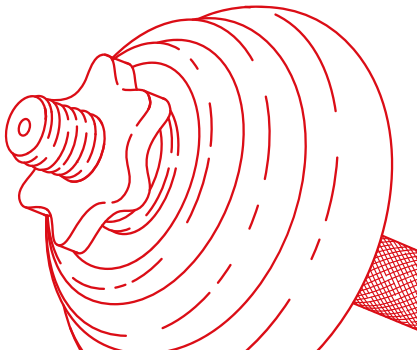
INJURIES

Acute traumatic injuries that are caused by high-speed collisions during racing will not be considered in this document as they are extremely difficult to account for from an S&C and physiotherapy perspective.

That being said, musculotendonous strength and bone mineral density have both consistently been shown to be improved by strength training as well as being predictive of the severity of impact injuries.

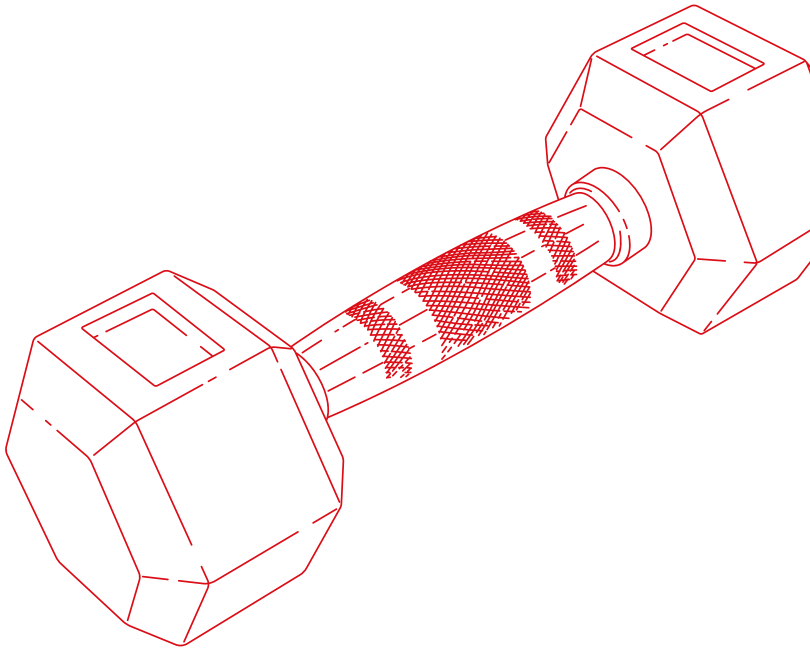
This document will focus on common chronic overuse injuries that can be avoided through simple and effective strength, mobility and stability training. The areas most frequently effected in endurance cycling are knees, lumber spine and cervical spine (neck). Ensuring riders have strong and stable hips and spine are paramount to reducing time spent off the bike.

These areas as well as well-balanced leg strength not only contribute to reducing knee pain but have also been indicated in positively effecting saddle health scores. Saddle health is an important issue within the youth cycling population and avoiding saddle sores will be one of the key targets of a well-balanced strength programme.

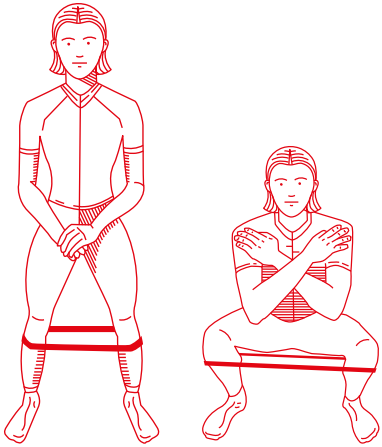


EXERCISES AND PROGRESSIONS

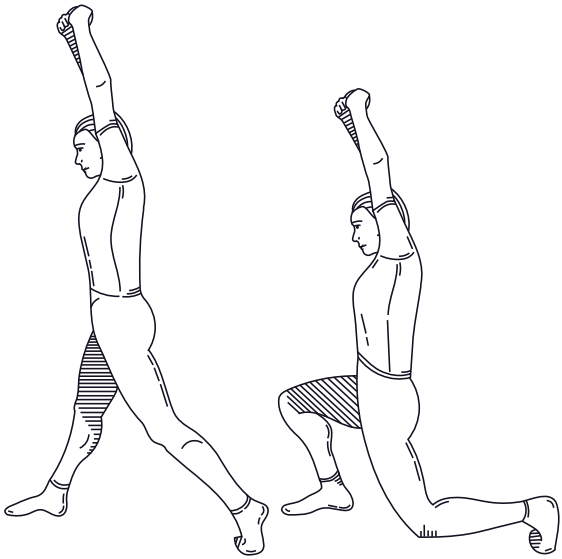
Pre- and post-routine



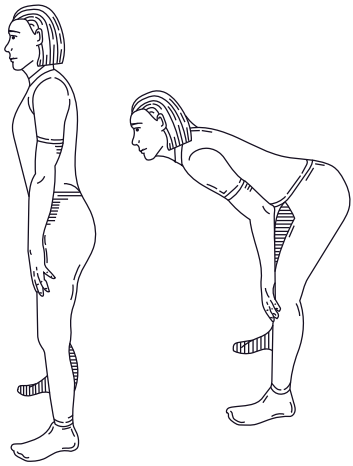
PRE-ROUTINE



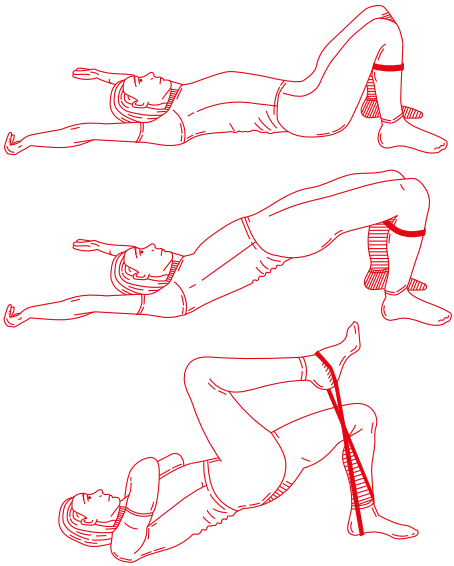
BANDED SQUAT



OVERHEAD SPLIT SQUAT

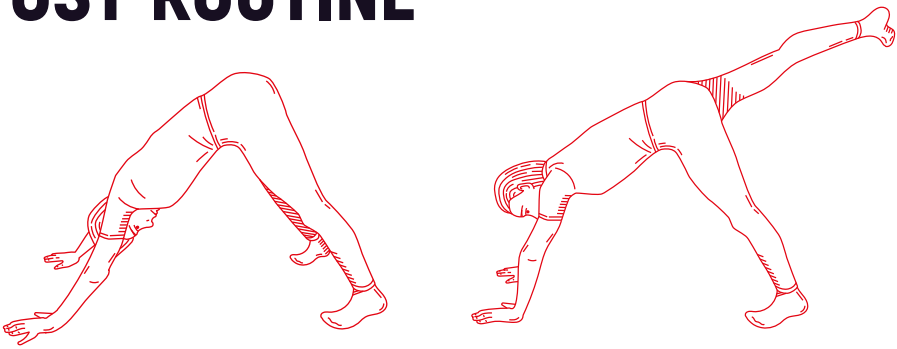


DOUBLE LEG RDL

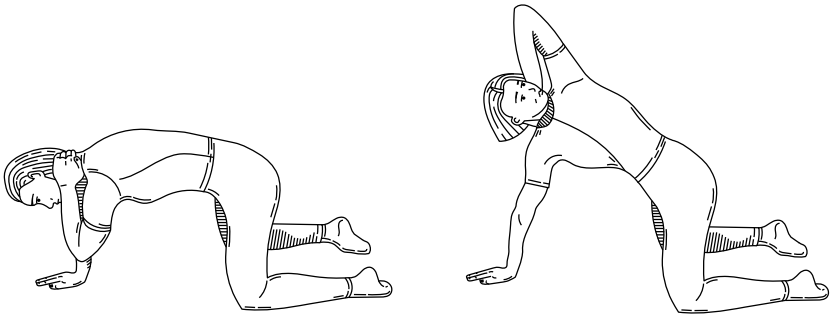


DOUBLE LEG AND/OR
SINGLE LEG BANDED GLUTE BRIDGE

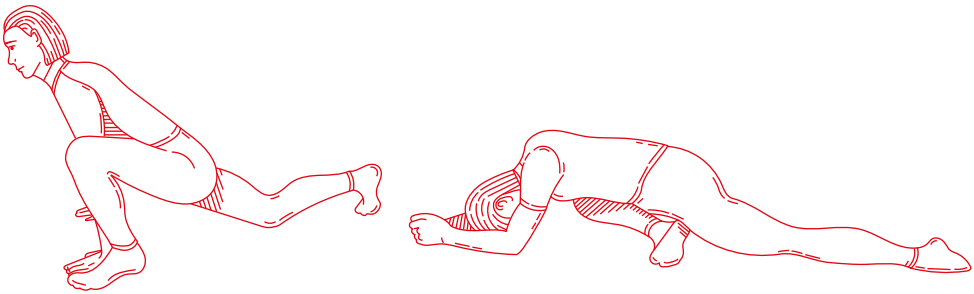
POST-ROUTINE



DOWNWARD DOG INTO
SPLIT LEG DOWNWARD DOG



KNEELING T-SPINE ROTATION



SPIDERMAN LUNGE
AND PIGEON STRETCH

SINGLE LEG HOP AND STICK

The hop and stick is the necessary precursor to intensive jumping activities that will help to increase high velocity force output.

This exercise teaches you to absorb forces effectively and safely. Jumping without a sound landing technique can lead to injuries – especially in the knees.

Hop and sticks should begin and end in the position shown in the photograph with the hip, knee and ankle stacked above one another.

Special attention should be paid to the tracking of the knee outside the toes. The hop should start and land on the same foot and the distance between hops should be limited to one that allows for a two second pause on landing. Once the checklist below has been completed for hop and sticks the same exercise can be performed from a small step or box. You should be consistent with drop and stick technique before moving onto any type of maximum effort jumping.

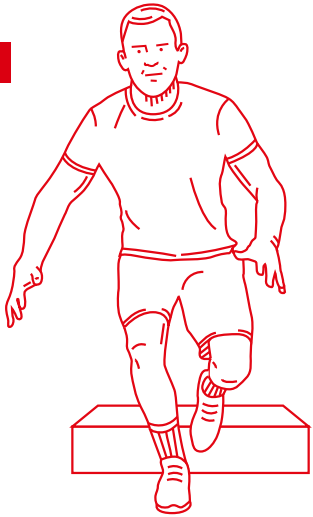
	A. HOP AND STICK	B. DROP AND STICK	C. JUMPING VARIATIONS
	Meets standard?		
1. STICK THE LANDING On landing balance must be maintained in a stable position for at least two seconds.	✓		
2. KNEE ALIGNMENT Knee should track inline or outside the line of the toes during landing and take-off.	✓		
3. MIDFOOT LANDING Weight should be distributed throughout the whole foot during landing.	✓		
4. QUIET LANDING Landing should be quiet and controlled as forces are absorbed effectively.	✓		
TOTAL	4/4	-/4	-/4

Athletes are required to meet all standards for each exercise before progressing to the next.

A

HOP AND STICK

B



DROP AND STICK

C JUMPING VARIATIONS

SQUAT

The squat is the fundamental movement pattern of the S&C programme within GBCT for cyclists. This is because the back squat in particular recruits more muscle fibres in the lower body than any other exercise, which in turn allows an athlete to produce a larger amount of force through the relevant muscles to cycling than in any other exercise.

The exercise is used frequently for endurance athletes at the podium level so providing a solid training history of squatting is important to young GBCT endurance riders. It is imperative to hit the technical markers and required standards at each stage before moving on to other squat variations.

The table below provides a progression of squat pattern exercises and a guideline of which technical markers should be met before moving on. If an athlete is performing squats under load without meeting these basic technical markers they should be regressed in exercise complexity and load until they can meet requirements.

	A. BODY WEIGHT SQUAT	B. SPLIT SQUAT	C. SINGLE LEG SQUAT	D. BACK SQUAT
	Meets standard?			
1. HIP BELOW KNEE Crease of hip should travel below the height of the knee.	✓			
2. KNEE TRACKING TOES The knee should steadily travel in line with the big toe or outside. Knees should not cave in; if in doubt: push them out!	✓			
3. EVEN WEIGHT DISTRIBUTION Weight should be evenly distributed throughout whole foot. The full sole of the shoe should be in contact with the ground.	✓			
TOTAL	3/3	-/3	-/3	-/3

Athletes are required to meet all standards for each exercise before progressing to the next.

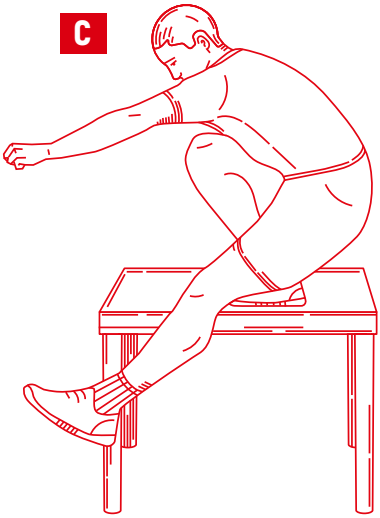
A

BODY WEIGHT SQUAT

B

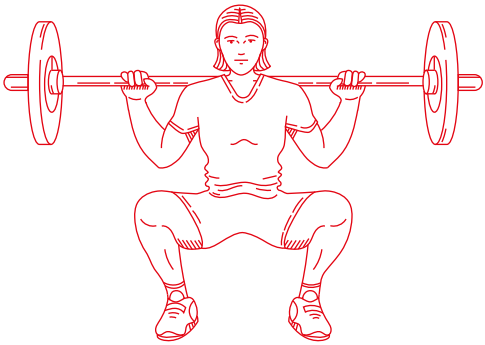
SPLIT SQUAT

C



SINGLE LEG SQUAT

D



BACK SQUAT

TRUNK CAPACITY

The importance of trunk stability under high loads has been emphasised throughout this document. Being able to maintain a neutral spine and resist high multi-planar forces is imperative for endurance cyclist robustness and performance.

The following tables provide a progression of the key trunk exercises performed and tested by the physiotherapists at GBCT. It describes which technical markers should be met before moving on. If an athlete is performing these under heavy load without meeting these basic technical markers, they should be regressed in exercise complexity and load until they can meet requirements. The required standards for each exercise is provided in the next section.

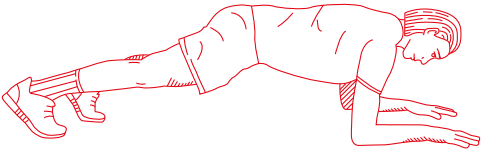
	A. PLANK	B. ISOMETRIC PRONE HOLD
	Meets standard for 90 secs each side?	
1. SPINE NEUTRAL Trunk should remain stable with a neutral spine throughout the movement.	✓	
2. HIPS AND SHOULDERS STACKED Hips should be in line with shoulders with no twist in the body.	✓	
3. GLUTES ACTIVATED Glutes should be working hard and the athlete shouldn't feel any work through the lower back.	✓	
TOTAL	3/3	-/3

	C. SIDE PLANK	D. ISOMETRIC LATERAL HOLD
	Meets standard for 90 secs each side?	
1. SPINE NEUTRAL Trunk should remain stable with a neutral spine throughout the movement.	✓	
2. HIPS AND SHOULDERS STACKED Hips should be in line with shoulders with no twist in the body.	✓	
TOTAL	2/2	-/2

	E. CRUNCH HOLD	F. HOLLOW HOLD	G. SUPINE HOLD
	Meets standard?		
1. LUMBAR SPINE NEUTRAL Trunk should remain stable with a neutral spine pressed into the ground with no arch.	✓		

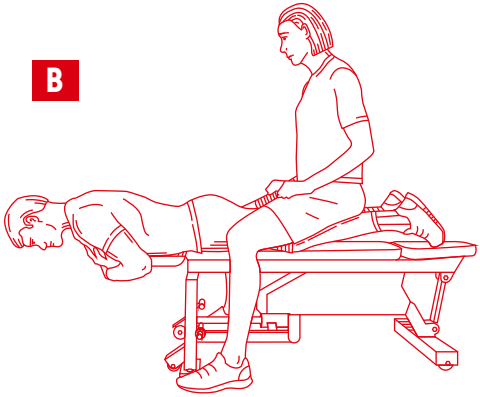
Athletes are required to meet all standards for each exercise before progressing to the next.

A



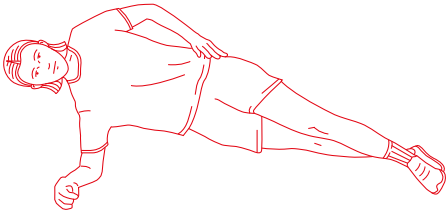
PLANK

B



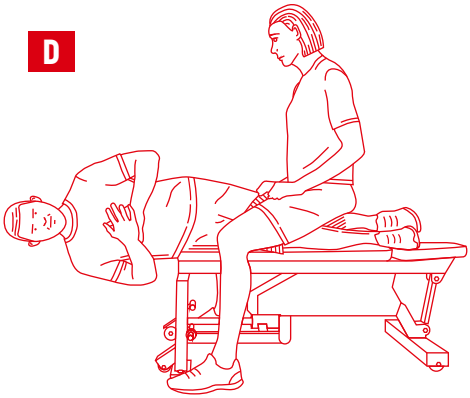
ISOMETRIC PRONE HOLD

C



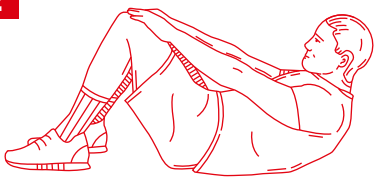
SIDE PLANK

D



ISOMETRIC LATERAL HOLD

E

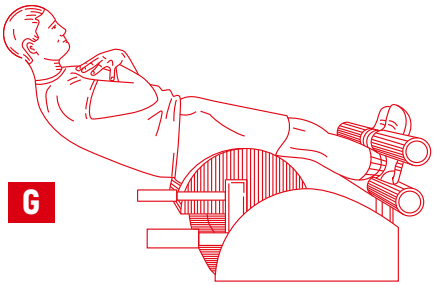


CRUNCH HOLD

F

HOLLOW HOLD

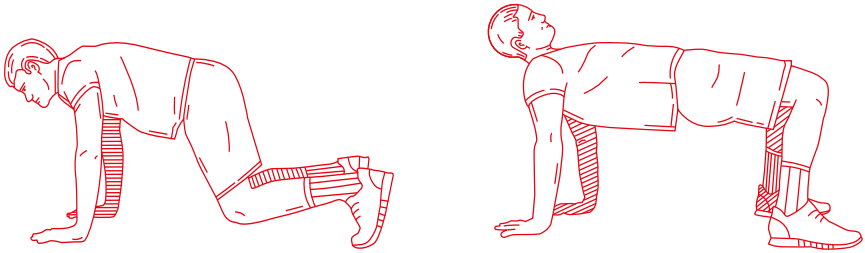
G



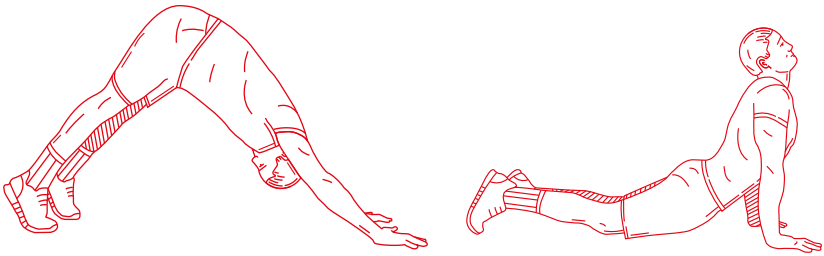
SUPINE HOLD

MOBILITY ANIMAL MOVEMENTS

FROG WALKS

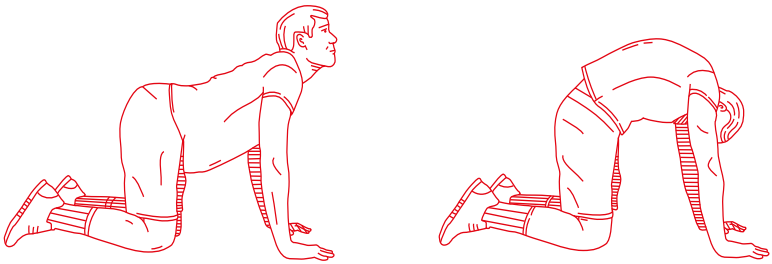


BEAR HOLD INTO CRAB HOLD

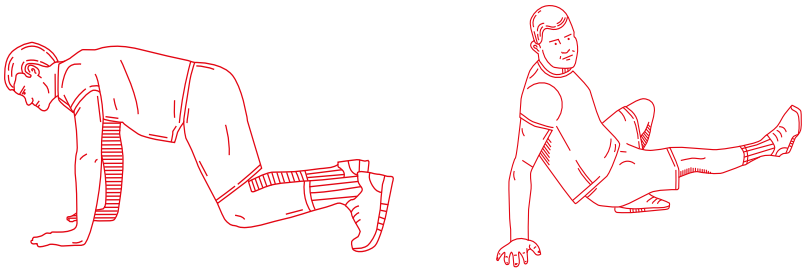


DOWNWARD DOG INTO COBRA

MOBILITY ANIMAL MOVEMENTS



CAT INTO CAMEL



BEAR HOLDS INTO MONKEY KICKS

BENCHMARKS

These are aspirational benchmark targets that give an indication that an athlete has the physical qualities required to perform at the relevant level.

SPRINT

WOMEN'S

	RSR	YOUTH	JUNIOR	U23	PODIUM
SL HOP AND STICK	100 cm	120 cm	*	*	*
SQUAT	10 SL at BW	"1 x BW (45-60kg x 5)"	"1.5 x BW (70-80kg x 5)"	"2 x BW (105-120kg x5)"	"2.2 x BW (130-140kg) "
DEADLIFT	*	60kg	80kg	110kg	130kg
PRONE HOLD	60s	90s	120s	180s	
SUPINE HOLD	30s	60s	90s	120s	
LATERAL HOLD	60s	90s	120s	120s + 5kg	
CMJ (W/KG)		55	60	65	70

MEN'S

	RSR	YOUTH	JUNIOR	U23	PODIUM
SL HOP AND STICK	100 cm	120 cm	*	*	*
SQUAT	10 SL at BW	"1 x BW (60kg-70kg x 5)"	"1.75 x BW (110-120kg x 5) "	"2 x BW (160-170kg x 5)"	"2.3 x BW (200kg)"
DEADLIFT	*	70-80kg	100kg	140kg	160kg
PRONE HOLD	60s	90s	120s	180s	
SUPINE HOLD	30s	60s	90sv	120s	
LATERAL HOLD	60s	90s	120s	120s + 5kg	
CMJ (W/KG)		60	65	75	85

BENCHMARKS

ENDURANCE

WOMEN'S

	RSR	YOUTH	JUNIOR	U23	PODIUM
SL HOP AND STICK	100 cm	120 cm	*	*	*
SQUAT	5 Single Leg at BW	10 Single Leg at BW	"15 Single Leg at BW or 1 x BW BacK Squat (45-50 x 5)"	"Squat (50-55kg)"	"Squat (60kg)"
PRONE HOLD	60s	90s	120s	180s	
SUPINE HOLD	30s	60s	90sv	120s	
LATERAL HOLD	60s	90s	120s	120s + 5kg	

MEN'S

	RSR	YOUTH	JUNIOR	U23	PODIUM
SL HOP AND STICK	100 cm	120 cm	*	*	*
SQUAT	5 at BW	10 at BW	15 at BW	*	*
PRONE HOLD	60s	90s	120s	180s	
SUPINE HOLD	30s	60s	90s	120s	
LATERAL HOLD	60s	90s	120s	120s + 5kg	