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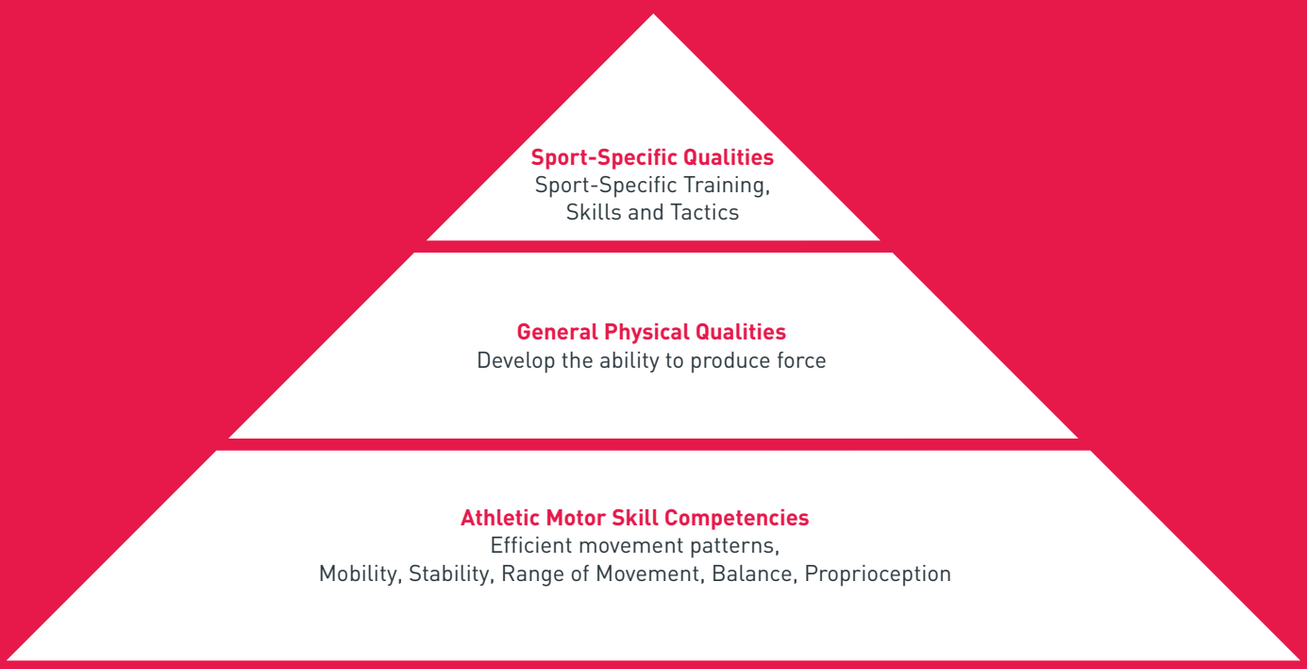
INTRODUCTION

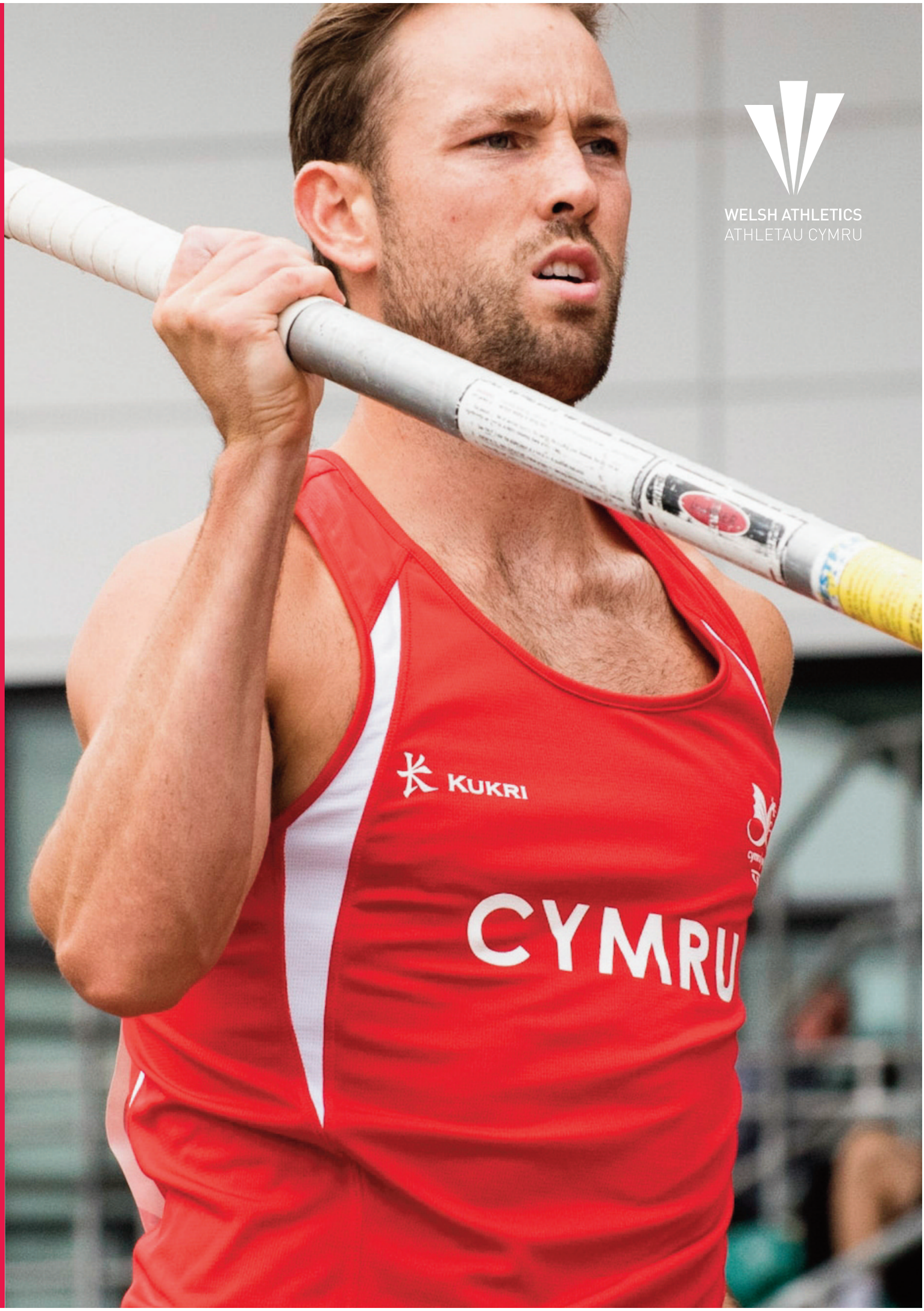
Sport Wales and Welsh Athletics share a philosophy regarding athlete development. Introducing and developing athletic motor skill competencies (AMSC) and general physical qualities prior to sport-specific training is essential for long-term success.

During physical maturity an athlete will progress through various stages of growth and development. Throughout this process the following components are still developing (i.e. underdeveloped); mobility, stability, proprioception and coordination. It is important to note that high volumes of sport-specific training may contribute to an increased risk of injury during this period of development. These risks are elevated further during periods of accelerated growth, commonly referred to as a 'growth spurt'.

To minimise these risks, training AMSC should be prioritised before progressing to sport-specific training and resistance training exercises. This will provide athletes with a range of movement skills that will better equip them to safely increase sport-specific training volume and eventually progress to resistance training exercises. Well planned athletic development focused on AMSC should challenge and develop mobility, stability, proprioception, general strength, coordination and balance. This has the benefits of improving movement to maximise sport-specific training, improve sports performance and minimise the risk of injury.



Welsh Athletics Coaching and Performance team


WELSH ATHLETICS
ATHLETAU CYMRU
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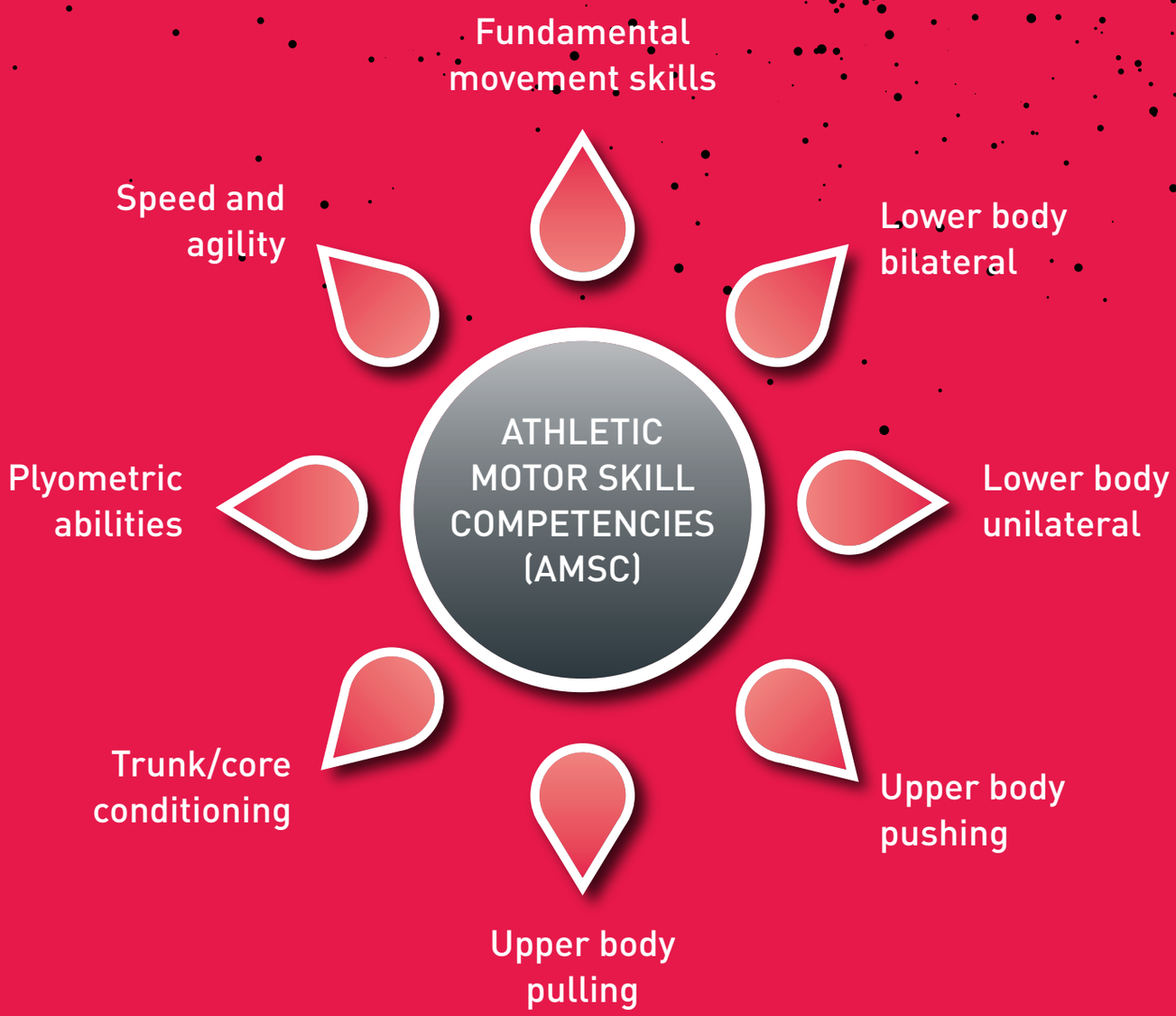
CYMRU

ATHLETIC MOTOR SKILL COMPETENCIES

Athletic motor skill competencies (AMSC) are movement skills that form the basis of global movements such as running, jumping and throwing. Placing a training emphasis on developing AMSC also allows for progression to more advanced athletic training. Well developed athletic motor skill competencies can help reduce the risk of injury and improve sports performance.

This resource provides a framework to measure and develop the following areas:

- Lower Body Bilateral - Squat & Hip Hinge
- Lower Body Unilateral - Lunge, Arabesque & Single Leg Squat
- Lower Body Conditioning - Calf, Hamstring & Glute
- Upper Body Conditioning - Core, Shoulder & Thoracic Spine



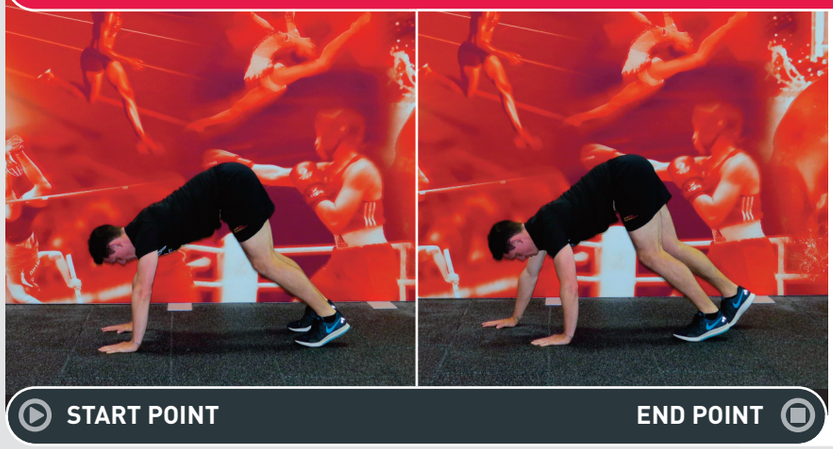
A.D., Lloyd, R.S., and Oliver, J.L. (2014)

FUNDAMENTAL MOVEMENT SKILLS

Crawling

- Crawling exercises strengthen muscles that connect the shoulder and opposite hip. These muscles must be strong to transfer force during sprinting, running, throwing and jumping.
- Crawling exercises help to develop coordination, hip mobility and stability, as well as, shoulder strength and stability.
- Crawling exercises develop awareness of posture and the ability to brace the trunk.

MONKEY WALK



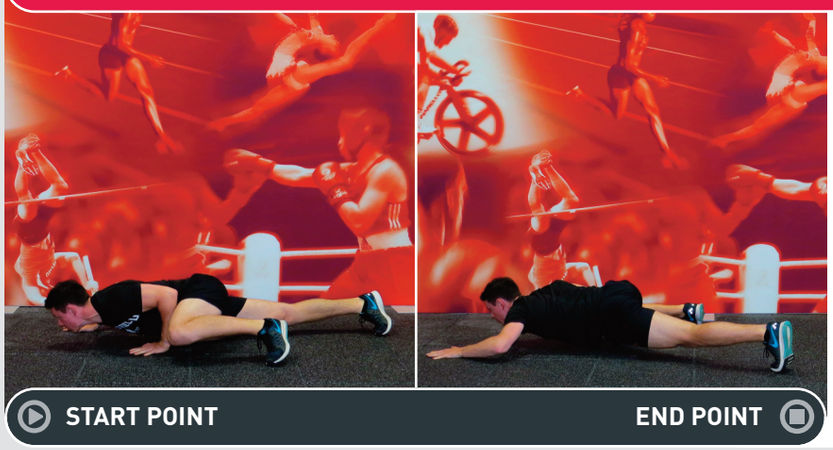
Technical Points

- ✔ Flat back
- ✔ Push hips as high as possible
- ✔ Move opposite arm and leg

Common Errors

- ✖ Rounded back
- ✖ Excessive knee bend
- ✖ Instability during movement

ALLIGATOR



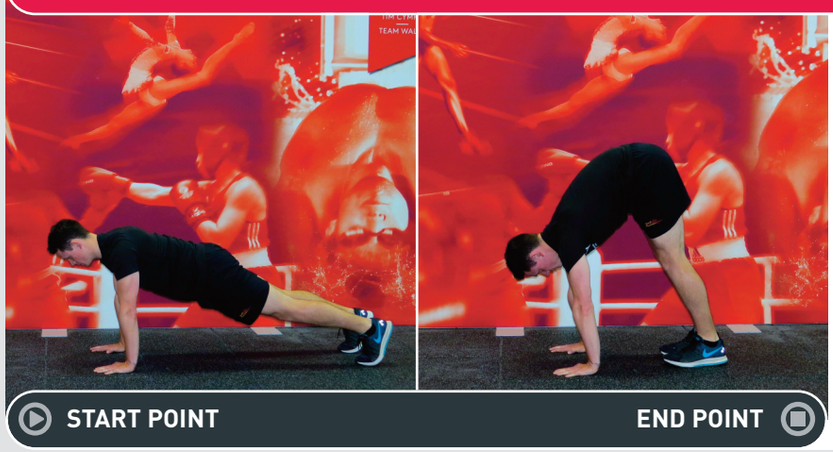
Technical Points

- ✔ Body close to the floor
- ✔ Move opposite arm and leg
- ✔ Stay on toes

Common Errors

- ✖ Hips higher than shoulders
- ✖ Knee inside of elbow
- ✖ Body too far from the floor

INCHWORM



Technical Points

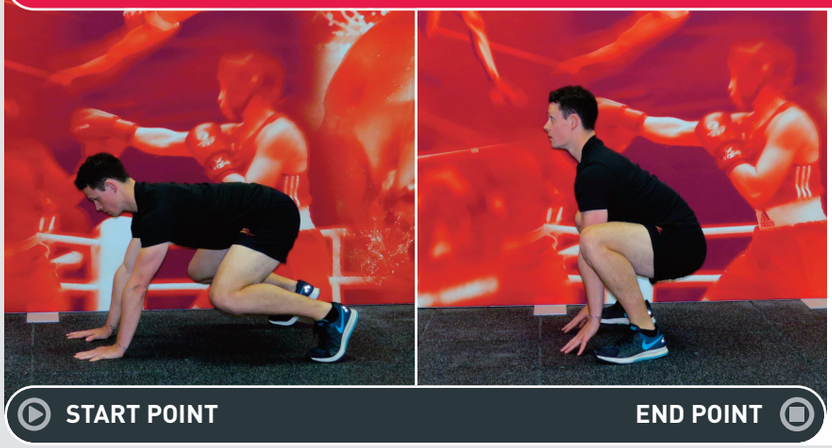
- ✔ Walk feet towards your hands
- ✔ Legs straight
- ✔ Push hips as high as possible

Common Errors

- ✖ Excessive knee bend
- ✖ Limited range of movement
- ✖ Arched lower back in start position

CRAWLING

BEAR



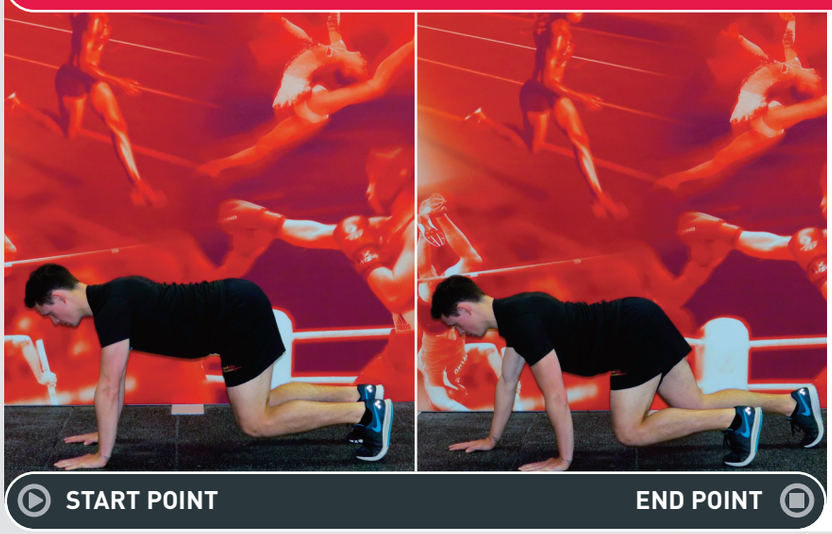
Technical Points

- ✔ Walk feet forward until knees are outside of elbows
- ✔ Chest up
- ✔ Feet flat

Common Errors

- ✖ Heels off the floor
- ✖ Feet rolling in
- ✖ Rounded back

TABLE TOP



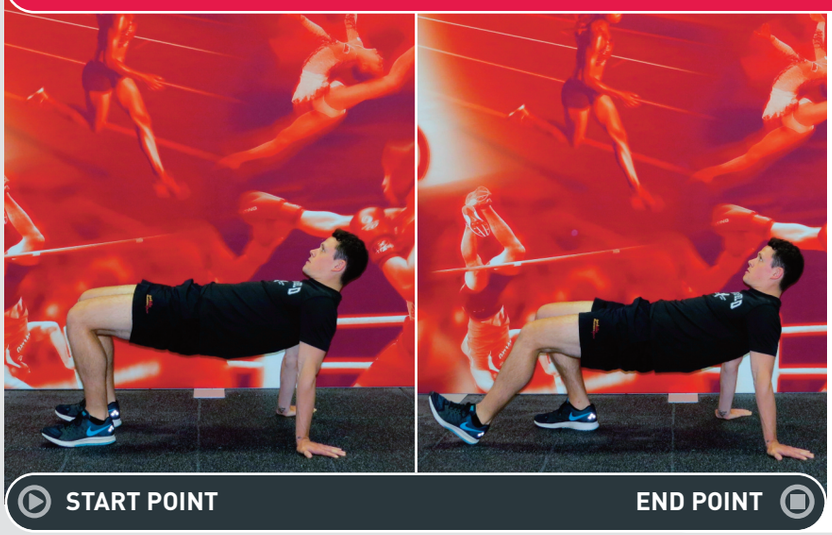
Technical Points

- ✔ Flat back
- ✔ Start - Knees under hips & wrists under shoulders
- ✔ On toes, move opposite arm and leg with hips as still as possible

Common Errors

- ✖ Arched at lower back
- ✖ Hips above shoulders
- ✖ Pelvis moving side to side

CRAB



Technical Points

- ✔ Start - heels under knees, wrists under shoulders
- ✔ Hips up, chest high
- ✔ Move opposite arm and leg

Common Errors

- ✖ Hips dropping
- ✖ Pelvis moving side to side
- ✖ Body too close to the floor

EXERCISE PROGRESSION

The exercise progressions in each of the following sections are designed to increase one or more of the following variables, in order to provide an enhanced level of challenge;

- Increase instability
- Increase speed of movement
- Increase the ground reaction force (intensive load)

It is important to note that an athlete should be able to consistently demonstrate that they are competent at level 1 exercises before progressing onto subsequent levels.

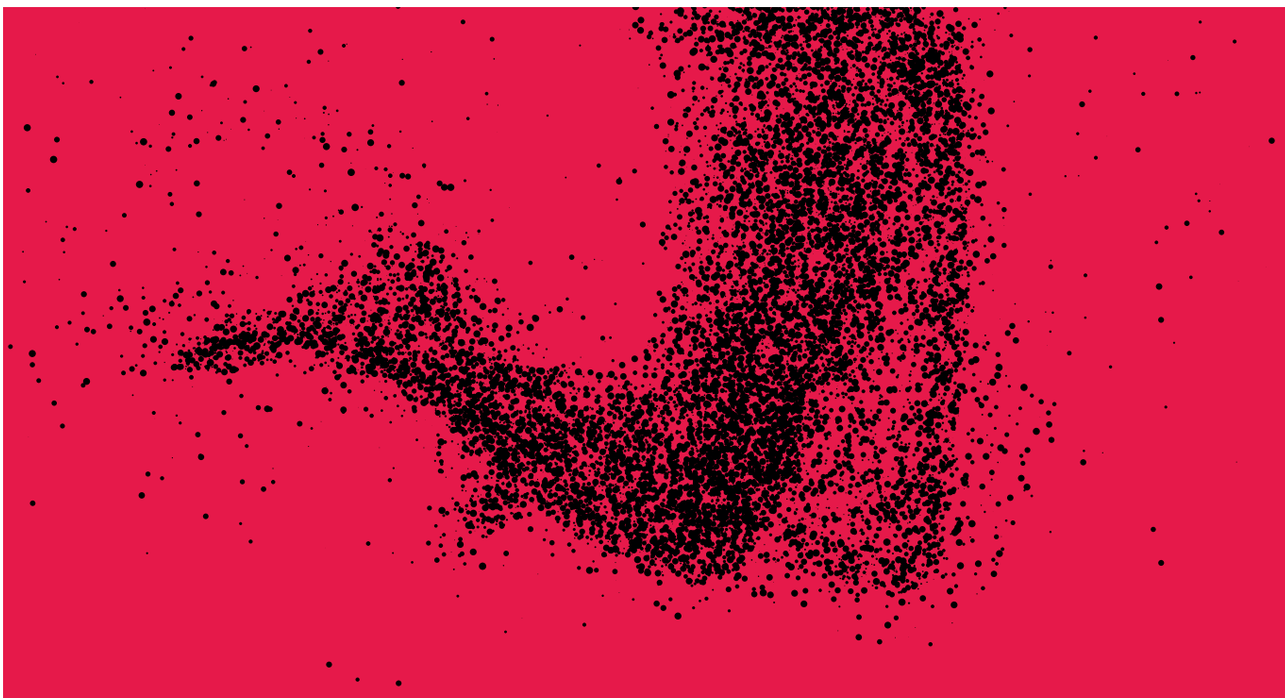
The technical competency model (right) provides a stepwise approach for coaches to determine the technical competency of the athlete(s) they have in front of them. Should an athlete not be able to demonstrate technical competency at any stage of the process, then the coach should attempt to correct movement with developmentally-appropriate cueing (external cues tend to be more effective).

If cueing does not help correct the movement, then coaches should regress the drill or use a corrective exercise. Where technical competency is repeatedly displayed in dynamic tasks, then the exercise should be progressed in a sensible manner.

Note: When you are observing athletes performing exercises and movement tasks, use the technical competency model (right) to assist with the coaching process and help inform your decision making.

What does movement competency look like?

A.D., Lloyd, R.S., and Oliver, J.L. (in press)



LOWER BODY BILATERAL SQUAT & HIP HINGE

- The squat and hip hinge exercises develop both mobility and stability of the ankle, hip, thoracic spine and shoulder.
- The squat and hip hinge exercises develop awareness of posture and proprioception which can contribute to an athletes awareness of body position within their event.
- Bilateral exercises are key movements which are essential to 'master' before progressing to weightlifting exercises. Athletes should not progress to more advanced exercises such as weightlifting and plyometrics before they can effectively perform a squat. (see page 34)

SQUAT

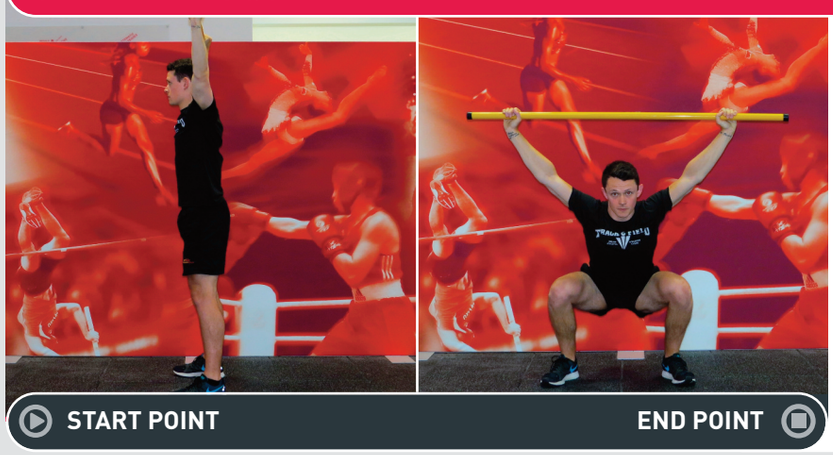
GOBLET SQUAT — LEVEL 1

Technical Points
- ✔ Hold ball at chest height in front of body
- ✔ Chest up when squatting
- ✔ Feet flat, hip width apart

PRISONER SQUAT — LEVEL 2

Technical Points
- ✔ Hands and elbows behind head

OVERHEAD SQUAT — LEVEL 3



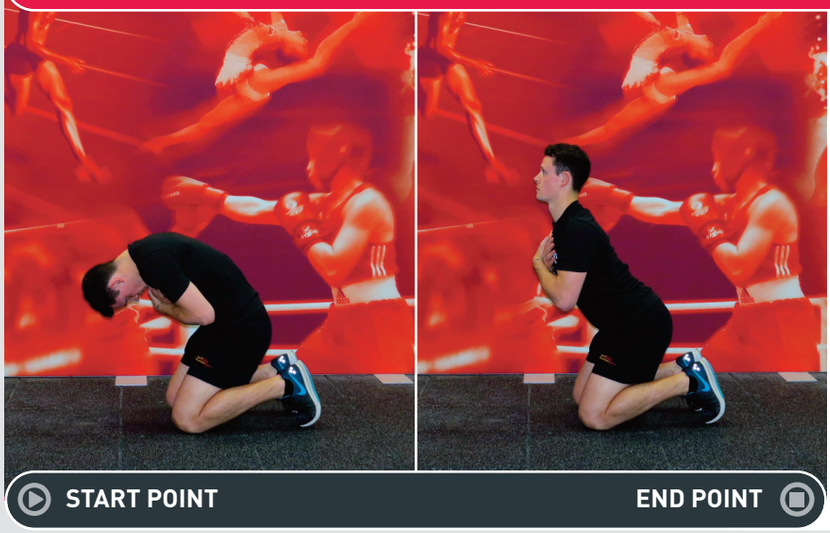
Technical Points
- ✔ Arms level
- ✔ Dowel behind head - in line with back of ears

General Technical Points
- ✔ Flat back with pelvis level
- ✔ Bend at hips & knees
- ✔ Weight on heels

General Common Errors
- ✖ Rounded back
- ✖ Knees too far over toes
- ✖ Weight towards front of foot

HIP HINGE

KNEELING BACK FLEXION & EXTENSION — LEVEL 1



Technical Points
- ✔ Tuck chin to chest when rounding (flexion) back
- ✔ Look up when arching (extension) back
- ✔ Move hips when rounding and arching back

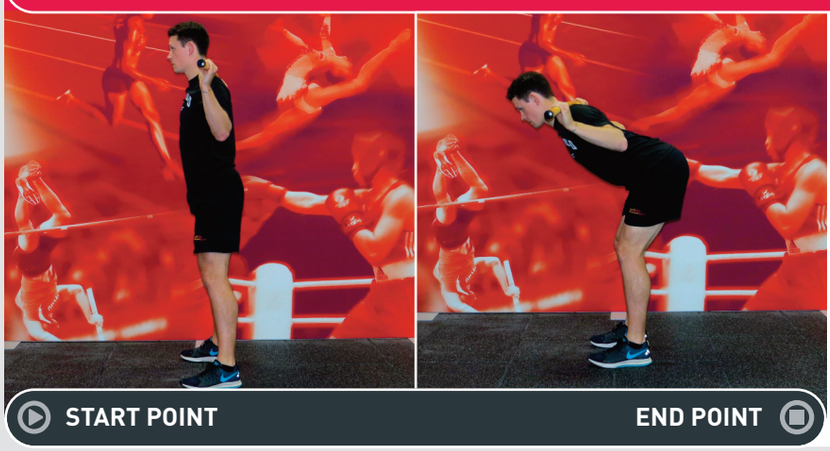
Common Errors
- ✖ Hips do not move when moving spine
- ✖ Movement not equal across spine i.e. moving from one point

KNEELING HIP HINGE — LEVEL 2

Technical Points
- ✔ Push hips back to heels and shoulders in front of knees (hips do not touch heels)

Common Errors
- ✖ Hips pushed too far back and touch heels

STANDING HIP HINGE (GOOD MORNING) — LEVEL 3



Technical Points
- ✔ Push hips back to behind heels and shoulder in front of toes

Common Errors
- ✖ Weight on toes

HIP HINGE

General Technical Points

- ✔ Flat back with pelvis level (neutral), head in line with spine
- ✔ Knees slightly bent – feel stretch on hamstring (when standing)
- ✔ Push hips back, shoulders in front of knees

General Common Errors

- ✖ Rounded back
- ✖ Shoulders not in front of knees
- ✖ Excessive knee bend, lack of tension in hamstrings

LOWER BODY UNILATERAL LUNGE, ARABESQUE & SINGLE LEG SQUAT

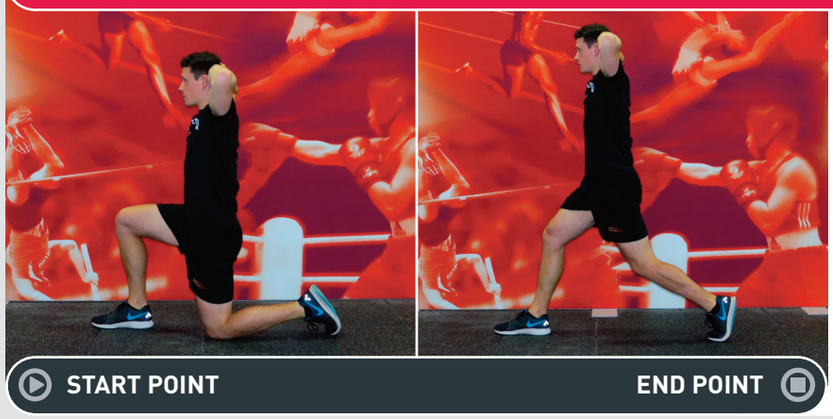
- Unilateral exercises develop balance and control in single leg stance positions. This is essential for performance in all athletics events.

- Unilateral exercises help to reduce strength and mobility imbalances between lower limbs, which can occur and be exacerbated by the asymmetrical nature of many athletics events. This can help to reduce the risk of common injuries associated with athletics.

- Unilateral exercises are key movements which are essential to 'master' before progressing to weightlifting exercises. Athletes should not progress to more advanced exercises such as weightlifting and plyometrics before they can effectively perform a lunge (see page 35).

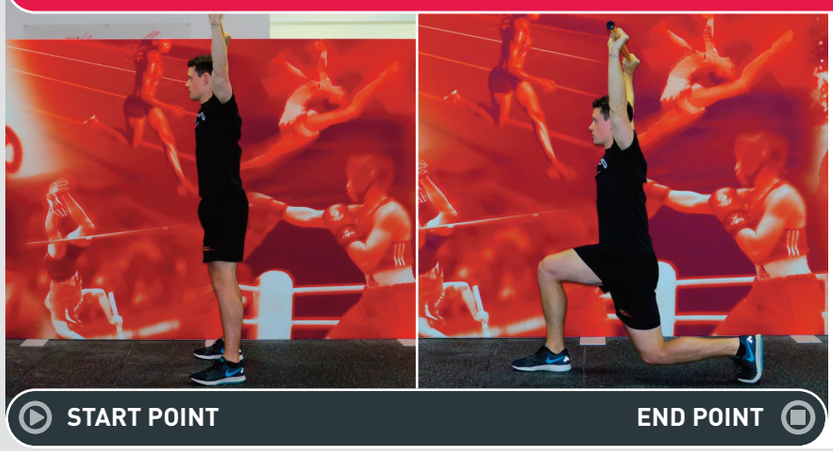
LUNGE

BOTTOM UP SPLIT SQUAT — LEVEL 1



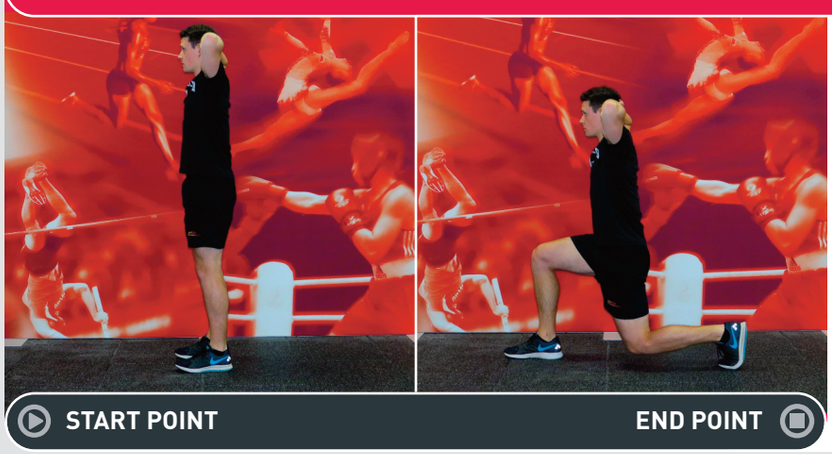
Technical Points
- ✔ Flat back, hands and elbows behind head
- ✔ Knees at 90°
- ✔ Front shin vertical

OVERHEAD LUNGE — LEVEL 2



Technical Points
- ✔ Arms straight above head
- ✔ Dowel behind head - in line with back of ears
- ✔ Step forwards into lunge position (knees 90°)

EXPLOSIVE FORWARD LUNGE — LEVEL 3



Technical Points
- ✔ Hands and elbows behind head
- ✔ Step forwards into lunge position as 'fast' and as 'explosively' as possible

General Technical Points
- ✔ Front foot flat on the floor
- ✔ Knees at 90°
- ✔ Flat back
- ✔ Front shin vertical

General Common Errors
- ✖ Forward trunk lean
- ✖ Rounded back
- ✖ Knees too far over front toes
- ✖ Knees not in line with toes

ARABESQUE

ARABESQUE STATIC HOLD (PARTNER ASSISTED) — LEVEL 1

Technical Points

- ✔ Use partner to help find a balanced Arabesque position.

ARABESQUE STATIC HOLD — LEVEL 2

Technical Points

- ✔ Move slowly and controlled from the start position to the end position
- ✔ Hold a balanced Arabesque position.

ARABESQUE MOVEMENT — LEVEL 3

Technical Points

- ✔ Move slowly and controlled from the start position to the end position
- ✔ Return to the start position with the same control and balance

General Technical Points

- ✔ Flat back
- ✔ Knee slightly bent – stretch should be felt on hamstrings (stance leg)
- ✔ Bend from waist, push heel of free leg back

General Common Errors

- ✖ Rounded shoulders
- ✖ Arch at lower back
- ✖ Hips not level
- ✖ Knees bend too much when pushing hips back – do not feel stretch on hamstrings

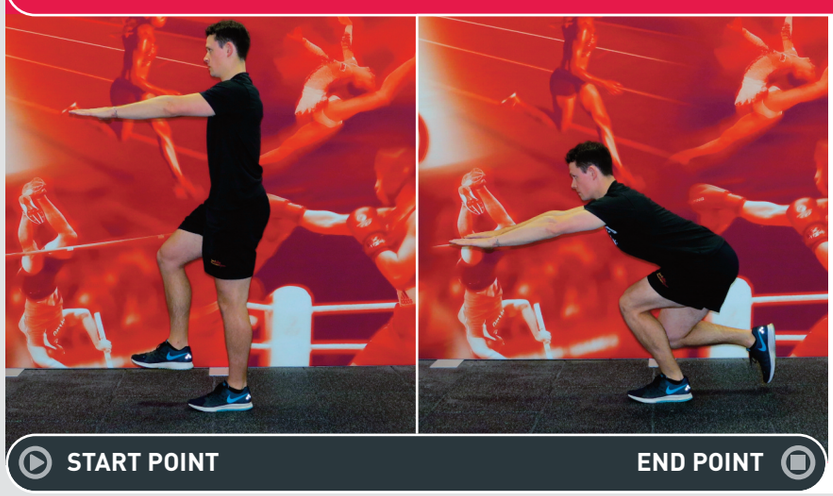
SINGLE LEG SQUAT

BULGARIAN SPLIT SQUAT — LEVEL 1

Technical Points
- ✔ Front foot flat
- ✔ Knee in line with toes and hips
- ✔ Flat back with pelvis level

Common Errors
- ✖ Heel off the floor
- ✖ Knee too far over front toes
- ✖ Rounded back, hips dropping

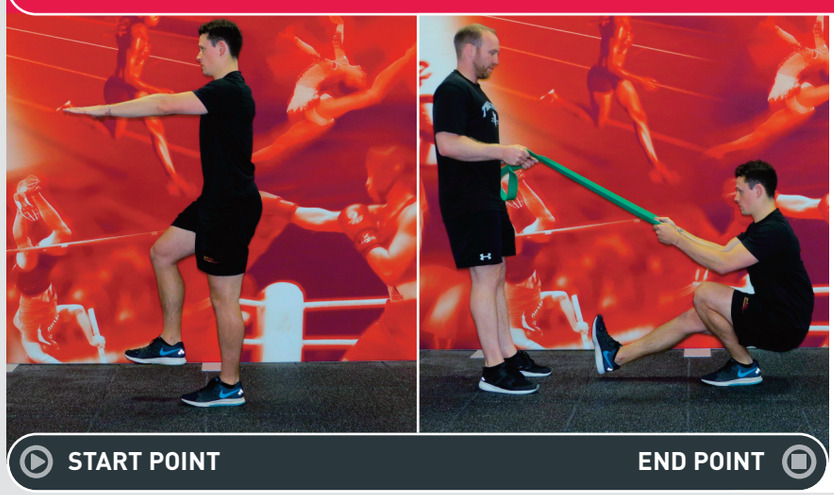
SKATER SQUAT — LEVEL 2



Technical Points
- ✔ Front foot flat, knee in line with toes and hips
- ✔ Flat back with pelvis level
- ✔ Arms level in front, lower rear knee to the floor

Common Errors
- ✖ Heel off the floor
- ✖ Rounded back, hips dropping
- ✖ Knee too far over front toes

PISTON SQUAT (PARTNER ASSISTED) — LEVEL 3

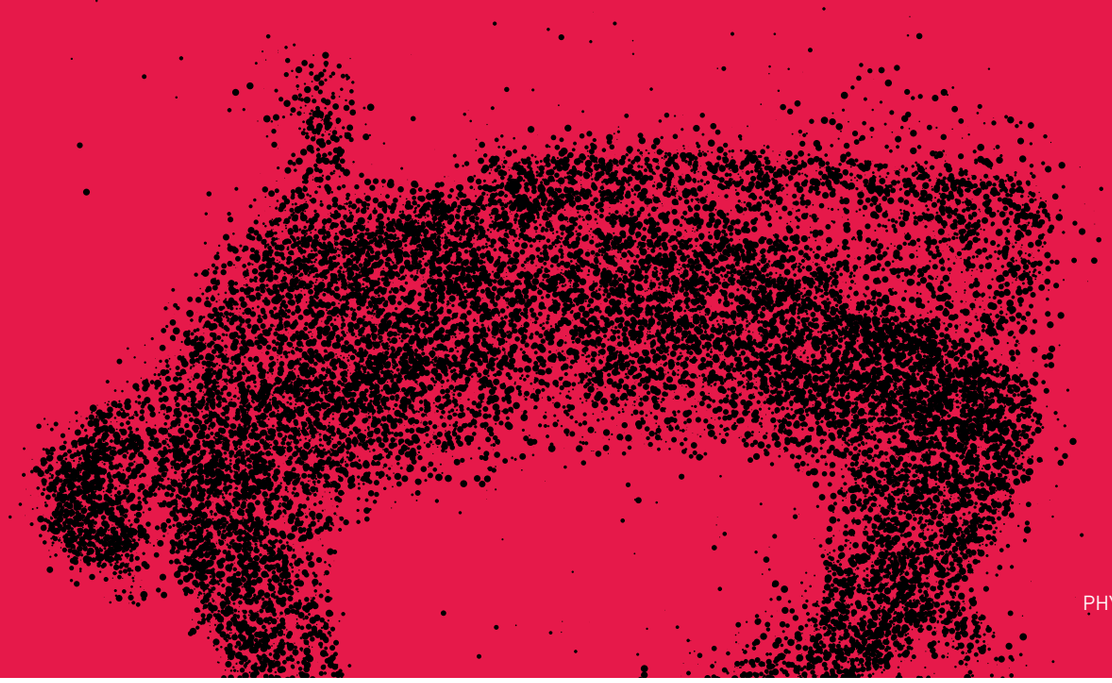


Technical Points
- ✔ Sit level down to the floor
- ✔ Front foot flat, knee in line with toes and hips
- ✔ Use band to maintain balance

Common Errors
- ✖ Front foot touches the floor
- ✖ Knee and hip not in line with toes

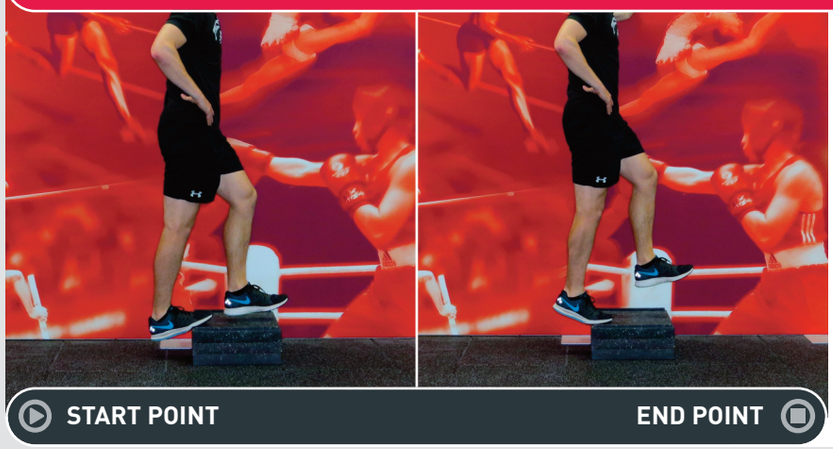
LOWER BODY CONDITIONING CALF, HAMSTRING & GLUTES

- Sprinting, Running, Jumping and Throwing exposes lower body muscle groups to high levels of stress.
- Developing and improving the conditioning of specific lower body muscle groups is essential to meet the demands placed upon the lower body from athletics events.
- Well conditioned lower body muscles can help to reduce the risk of injury



CALF

STRAIGHT KNEE CALF RAISE (GASTROCNEMIUS)



Technical Points

- ✔ Knee straight – feel calf stretch at start position
- ✔ Complete each repetition slowly and smoothly (tempo - 1s up, 1s down)

BENT KNEE CALF RAISE (SOLEUS)

Technical Points

- ✔ Knee bent – feel calf stretch at start position
- ✔ Knee slightly in front of toes – maintain bent knee angle throughout each repetition
- ✔ Complete each repetition slowly and smoothly (tempo - 1s up, 1s down)

General Technical Points

- ✔ Ankle in line with toes
- ✔ Hips level
- ✔ Lift heel as high as possible

General Common Errors

- ✖ Ankle not in line with toes
- ✖ Hips drop to the side (not level)
- ✖ Not going as high as possible onto toes

Note: for balance hold onto to something e.g. a partner or rail

SINGLE LEG HAMSTRING BRIDGE - ISOMETRIC (FLOOR) — LEVEL 1

Technical Points

- ✔ Hold position with no movement

SINGLE LEG HAMSTRING BRIDGE – REPS (FLOOR) — LEVEL 2

Technical Points

- ✔ Complete each repetition slowly and smoothly (tempo - 1s up, 1s down)
- ✔ Brief pause at the top and bottom of each repetition

SINGLE LEG HAMSTRING BRIDGE - REPS (ELEVATED) — LEVEL 3

Technical Points

- ✔ Complete each repetition slowly and smoothly (tempo - 1s up, 1s down)
- ✔ Brief pause at the top and bottom of each repetition
- ✔ Set up with partner, support should be at knee height

General Technical Points

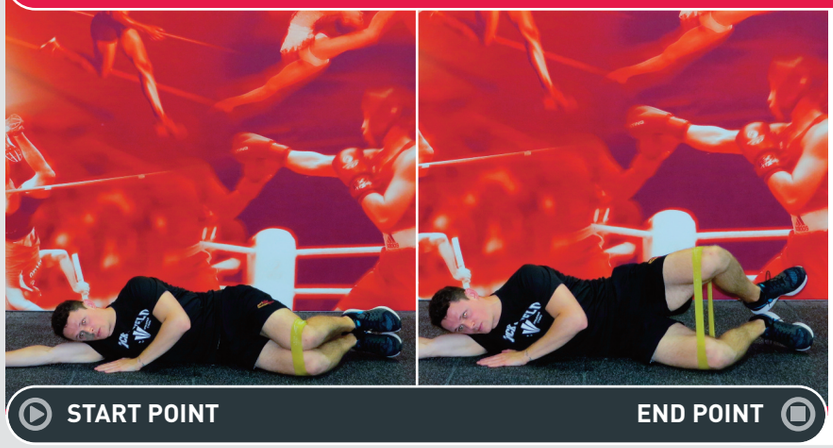
- ✔ Knee approx. 135°
- ✔ Extend hips fully at top position - knees, hips and shoulders in line
- ✔ Flat back, push hips up - neutral position (level)

General Common Errors

- ✖ Hips not fully extended - knee, hips & shoulders not in line
- ✖ Hips dropping
- ✖ Arching or rounding of the back

GLUTES

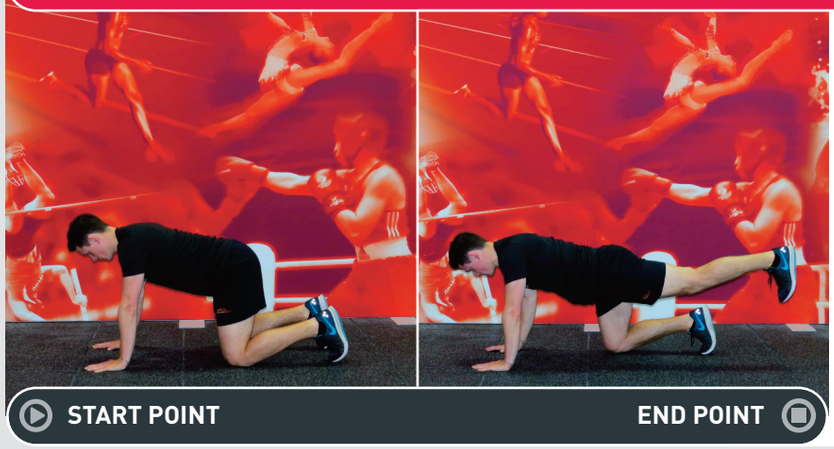
SIDE LYING CLAMS — LEVEL 1



Technical Points
- ✔ Hips in line
- ✔ Heels together

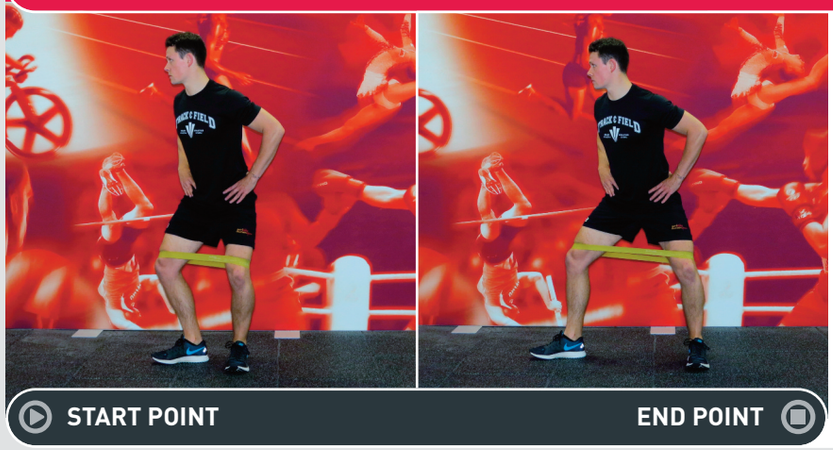
Picture shows use of a band, this is a progression. Start with no band

FOUR POINT KNEELING HIP EXTENSION — LEVEL 2



Technical Points
- ✔ Flat back
- ✔ Extend leg straight
- ✔ Hips level

FENCING DRILL — LEVEL 3



Technical Points
- ✔ Knees facing away from each other (maintain tension on band)
- ✔ Bend knees to partial squat position
- ✔ Move forwards with the front foot

Common Errors
- ✖ Pelvis tilted (forwards/backwards)
- ✖ Arching or rounding of the back
- ✖ Knees collapse towards each other

UPPER BODY CONDITIONING CORE, SHOULDER & THORACIC SPINE

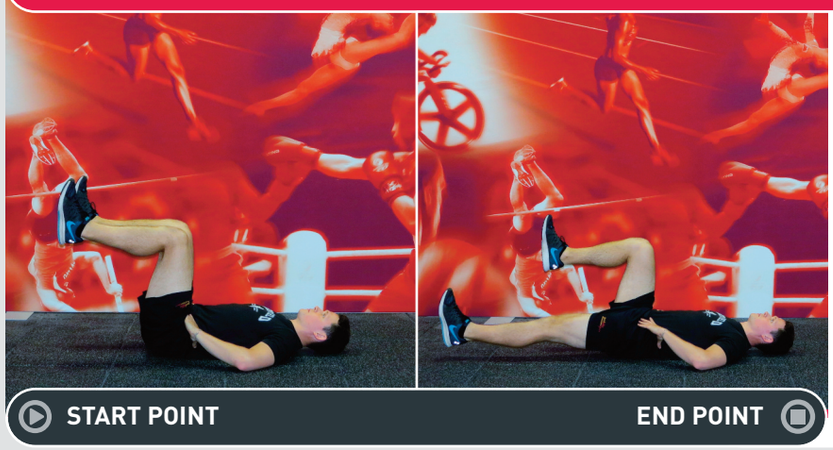
- Developing a strong trunk enables athletes to attain and maintain correct postures during sprinting, running, jumping and throwing.
- Developing a strong trunk helps to reduce the risk of injury, specifically; Hamstrings, Adductors and Shoulders.
- Trunk muscles must be strong to transfer force during sprinting, running, jumping and throwing.
- Good thoracic mobility is essential for all athletics events.
- Thoracic and shoulder mobility should be developed before improving shoulder strength.
- Posterior shoulder strength is very important to develop for throwers in particular, as the nature of throwing events overdevelops the anterior shoulder.

LOWER ABDOMINALS

Lower Abdominal Conditioning Level Progression

When the athlete can achieve 30 repetitions achieving all listed technical points with no common errors evident, they can progress to the next level. See page 40 & 41 'Measures of Performance'.

SINGLE LEG LOWERS (STRAIGHT KNEE) — LEVEL 1



Technical Points

- Lower back flat on floor
- Pelvis neutral (level)
- Brace abdominals (tension)

Common Errors

- Arching of the lower back
- Belly raises during exercise
- Discomfort in lower back (regress exercise)

DOUBLE LEG LOWERS (BENT KNEE) — LEVEL 2

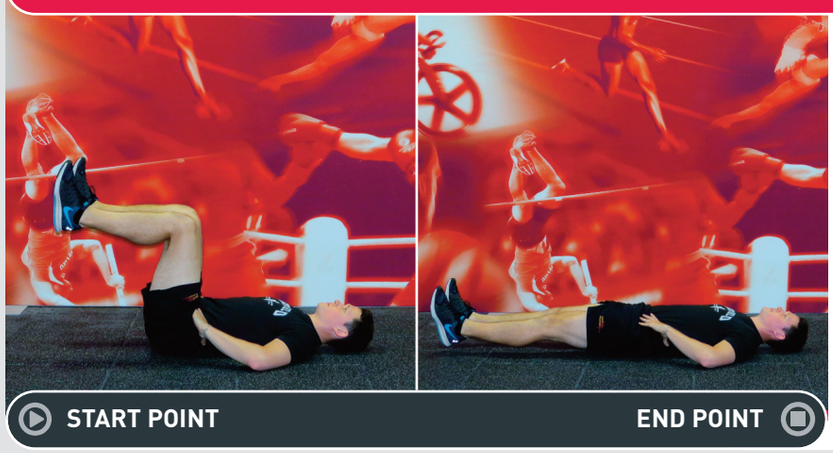
Technical Points

- Lower back flat on floor
- Pelvis neutral (level)
- Brace abdominals (tension)

Common Errors

- Arching of the lower back
- Belly raises during exercise
- Discomfort in lower back (regress exercise)

DOUBLE LEG LOWERS (STRAIGHT KNEE) — LEVEL 3



Technical Points

- Lower back flat on floor
- Pelvis neutral (level)
- Brace abdominals (tension)

Common Errors

- Arching of the lower back
- Belly raises during exercise
- Discomfort in lower back (regress exercise)

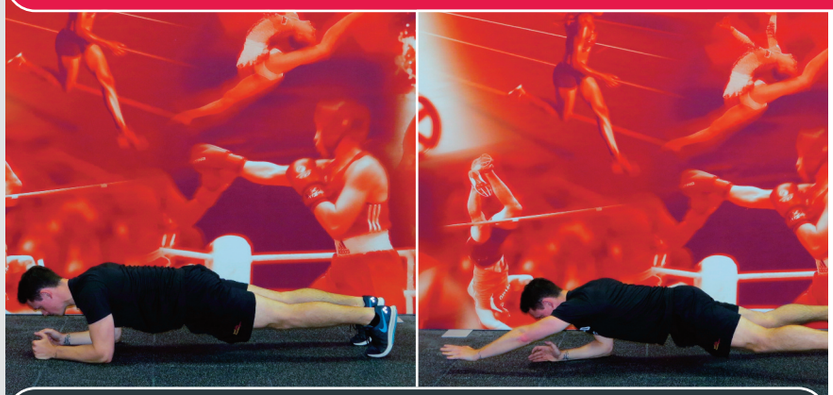
ABDOMINAL BRACING

FRONT PLANK — LEVEL 1

Technical Points

- ✔ Hips level – no pelvic tilt (right/left or forwards/backwards)
- ✔ Brace abdominals (tension)
- ✔ Back flat – hips, back and shoulders in line

FRONT PLANK HAND RAISE — LEVEL 2



Technical Points

- ✔ Lift arms alternately

FRONT PLANK OPPOSITE HAND AND LEG RAISE — LEVEL 3

Technical Points

- ✔ Lift opposite arm & leg

Note: If the athlete is unable to hold any of these positions without arching their back or unable keep their pelvis level, regress the exercise onto their knees

ABDOMINAL BRACING

General Technical Points

- ✔ Back flat – hips, back and shoulders in line
- ✔ Hips level – no pelvic tilt (right/left or forwards/backwards)
- ✔ Brace abdominals (tension)

General Common Errors

- ✖ Arching or rounding of the back
- ✖ Discomfort in lower back (regress exercise)

LEVEL	EXCERCISE	LEVEL PROGRESSION
1	Front Plank	60s must be perfect form
2	Front Plank Hand Raise	20 repetitions (10 reps each arm) must be perfect form slow controlled repetitions
3	Front Plank Opposite Hand and Leg	20 repetitions (10 reps each arm & leg) must be perfect form slow controlled repetitions

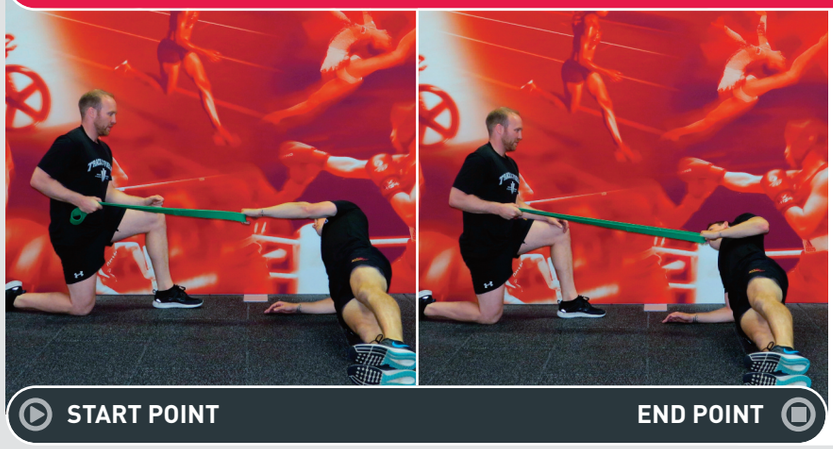
SIDE TRUNK BRACING

SIDE PLANK — LEVEL 1

Technical Points

- ✔ Hold position with no trunk movement
- ✔ Free arm extended upwards

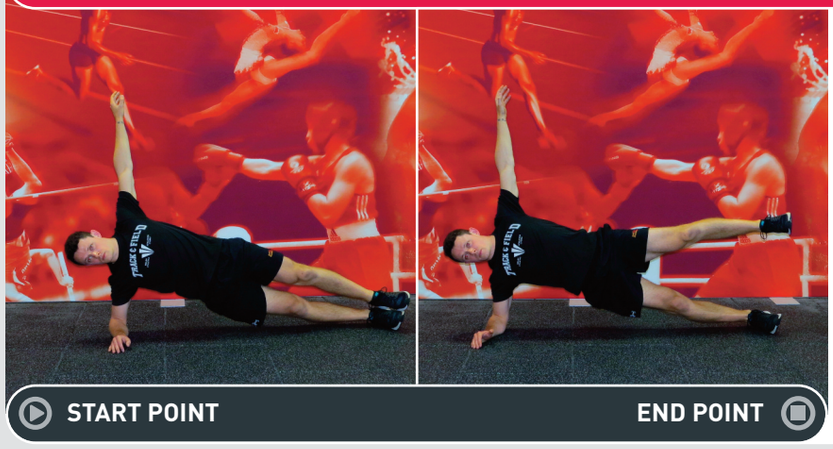
SIDE PLANK BAND PULL — LEVEL 2



Technical Points

- ✔ Hold position with no trunk movement
- ✔ Pull arm from extended position to armpit

SIDE PLANK LEG RAISE & HOLD — LEVEL 3



Technical Points

- ✔ Hold position with no trunk movement
- ✔ Free arm extended upwards
- ✔ Lift top leg up and hold

SIDE TRUNK BRACING

General Technical Points

- ✔ Back flat – hips, back and shoulders in line
- ✔ Hips level – no pelvic tilt (right/left or forwards/backwards)
- ✔ Brace abdominals (tension)
- ✔ Hold position with no movement

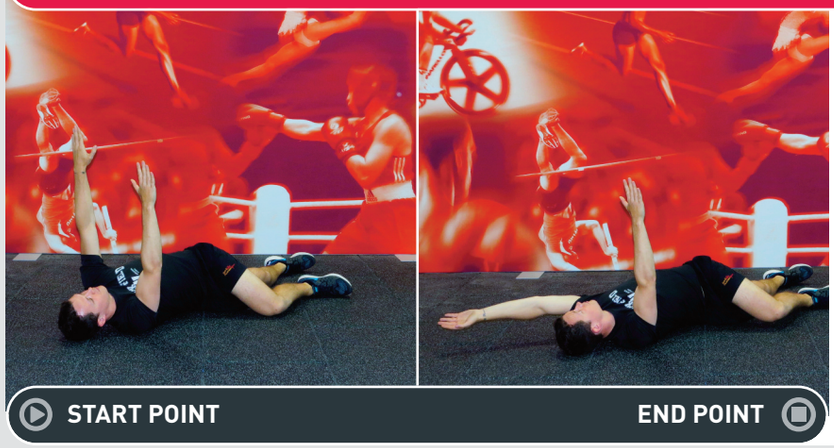
General Common Errors

- ✖ Arching or rounding of the back
- ✖ Discomfort in lower back (regress exercise)

LEVEL	EXERCISE	LEVEL PROGRESSION
1	Side Plank	60s must be perfect form
2	Side Plank Band Pull	20 repetitions (10 reps each arm) must be perfect form slow controlled repetitions
3	Side Plank Leg Raise & Hold	30s must be perfect form

SHOULDER & THORACIC SPINE

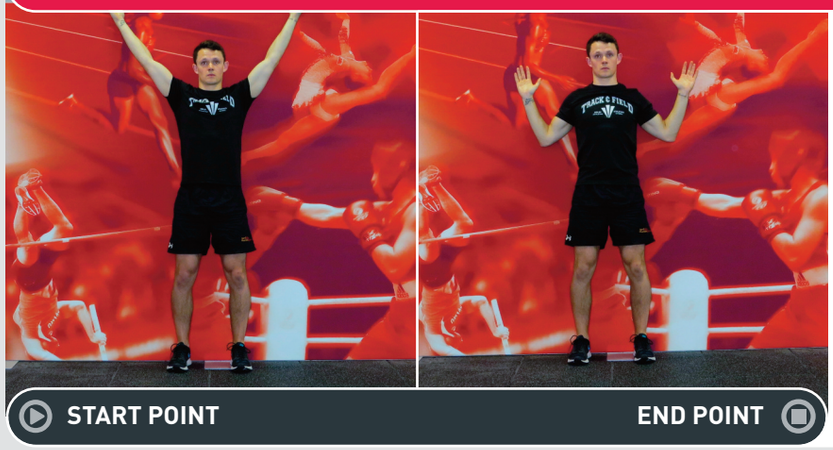
THORACIC EXTENSION WITH ROTATION



Technical Points

- ✔ Rotate upper body - look at the ceiling
- ✔ Extended arm - Shoulder and hand touch the floor
- ✔ Bent knee stays in contact with floor

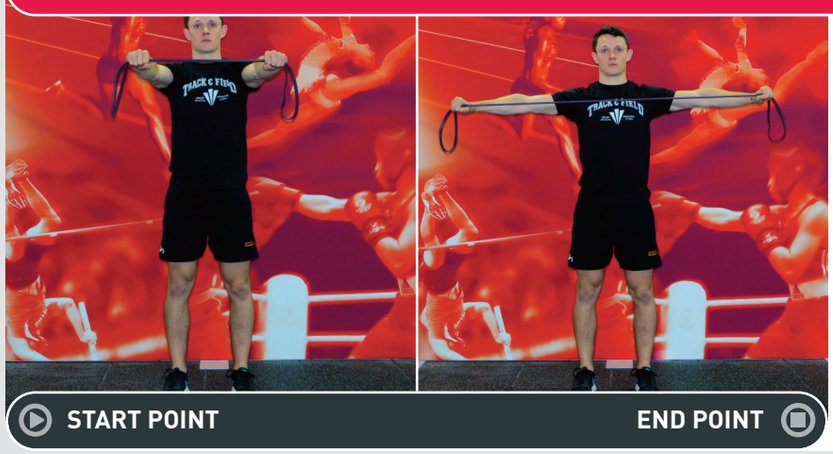
WALL SLIDES



Technical Points

- ✔ Hips, lower back and shoulder should touch the wall
- ✔ Slide elbows to hips
- ✔ Hips, lower back, shoulders, elbows and hands should all be in contact with the wall during the movement.

BAND PULL APARTS



Technical Points

- ✔ Hold band outstretched - no bend in elbows (maintain tension in band)
- ✔ Pull band apart - maintain straight elbows
- ✔ Keep shoulders down

MEASURES OF PERFORMANCE

This section will demonstrate how coaches can assess movement competency, as well as, test an athletes strength capacity for key muscle groups;

Assessing movement competency;

- Squat
- Lunge

Strength and capacity testing;

- Calf
- Hamstring
- Lower Abdominals
- Abdominal Bracing

SQUAT - SCORING SYSTEM

SCORING ELEMENTS (1 POINT FOR EACH SUCCESSFUL TECHNIQUE)	SCORE
Heels remain flat on floor (fig 1)	
Knees in line with toes (fig 2)	
Hips below knees (fig 3)	
Back remains flat (fig 3)	
Shoulders in line with mid foot (fig 4)	
Total Score	/5

Athlete must obtain each of these scoring elements for five consecutive repetitions.
Consistency of success must be evident.

FIG 1

FIG 2

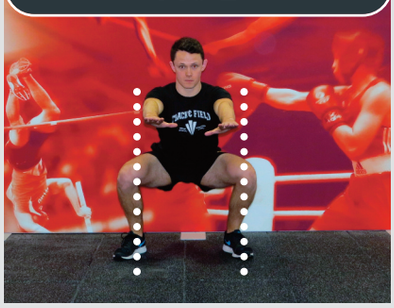
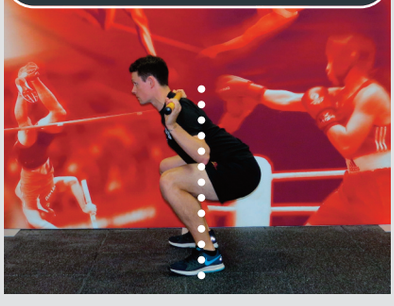


FIG 3

FIG 4



LUNGE - SCORING SYSTEM

SCORING ELEMENTS (1 POINT FOR EACH SUCCESSFUL TECHNIQUE)	SCORE
Front heel remains flat on floor (fig 1)	
Knees in line with toes (fig 2)	
Knee, hip and shoulder in line (fig 3)	
Back remains flat (fig 4)	
Front knee does not travel over the front toe (fig 5)	
Total Score	/5

Athlete must obtain each of these scoring elements for five consecutive repetitions.
Consistency of success must be evident.

FIG 1

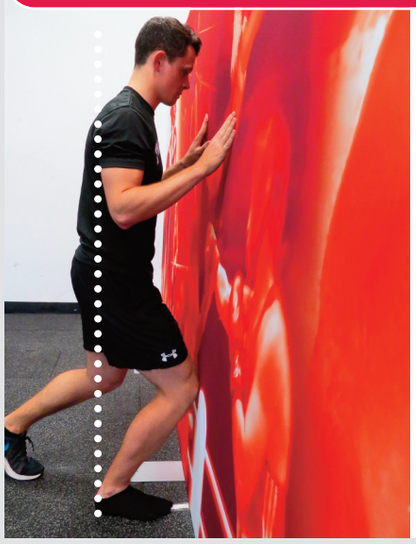
FIG 2

FIG 3

FIG 4

FIG 5

MOBILITY TESTING



Set up

- ✔ Place measuring tape against the Wall
- ✔ Keep hip on top of heel
- ✔ Keep knee in line with toe and hip
- ✔ Knee must touch wall with the heel maintaining contact with the floor for the measure to be successful

SCORING

Excessive ankle mobility	→18
Increased ankle mobility	13-17
No significant restriction	8-12
Reduced ankle mobility	4-7
Significantly reduced ankle mobility	←3

SCORE (CM)	←7CM	8-12CM	→18
Interpretation	Ankle restriction	Normal mobility	Excessive mobility
Intervention	Prioritise ankle mobility and calf stretching	Maintain ankle mobility and continue calf strengthening	Prioritise calf strengthening

Note: It is important to identify any imbalances from left to right. If there are significant imbalances this may increase the risk of potential injury. Over time prioritise increasing the side with the lowest measurement or performance score to equal that of the highest scoring side. Aim for symmetry between left and right.

CALF

STRENGTH TESTING

START POINT

END POINT

Set up

- ✔ Knee straight – feel calf stretch at start position
- ✔ Ankle in line with toes
- ✔ Hips level
- ✔ Lift heel as high as possible
- ✔ Complete each repetition slowly and smoothly (tempo - 1s up, 1s down)

SCORING

Significantly above average	34
Above average	27
Average	20
Below average	13
Needs significant improvement	10

SCORE (REPS)	←14 REPS	20 REPS	→27 REPS
Interpretation	Very poor calf strength	Average calf strength	Good calf strength
Intervention	Prioritise calf strengthening	Continue calf strengthening	Maintain strength and mobility

Note: It is important to identify any imbalances from left to right. If there are significant imbalances this may increase the risk of potential injury. Over time prioritise increasing the side with the lowest measurement or performance score to equal that of the highest scoring side. Aim for symmetry between left and right.

MOBILITY TESTING

START POINT END POINT

Set up

- ✔ Both knees should stay straight during test
- ✔ Lift foot as high as possible
- ✔ Movement should be slow and top position must be held for 1s

SCORE	CANNOT GET ANKLE ABOVE DOWEL AT KNEE HEIGHT	CAN GET ANKLE ABOVE DOWEL AT KNEE HEIGHT, BUT NOT ABOVE DOWEL AT HIP HEIGHT	CAN GET ANKLE ABOVE DOWEL AT HIP HEIGHT
Interpretation	Significantly tight hamstrings	Tight Hamstrings	Good hamstring flexibility
Intervention	Prioritise hamstring flexibility	Prioritise hamstring flexibility	Maintain hamstring flexibility

Note: It is important to identify any imbalances from left to right. If there are significant imbalances this may increase the risk of potential injury. Over time prioritise increasing the side with the lowest measurement or performance score to equal that of the highest scoring side. Aim for symmetry between left and right.

HAMSTRING

STRENGTH TESTING

START POINT

END POINT

Set up

- ✔ Knee at around 135° (Half way between fully straight and 90°)
- ✔ Hip must touch floor at bottom and fully extend at top
- ✔ Complete each repetition slowly and smoothly (tempo - 1s up, 1s down)

SCORING

Significantly above average	35
Above average	30
Average	25
Below average	20
Needs significant improvement	13

SCORE (REPS)	←20 REPS	25 REPS	→30 REPS
Interpretation	Very poor hamstring strength	Average hamstring strength	Good hamstring strength
Intervention	Prioritise hamstring strengthening	Continue hamstring strengthening	Maintain hamstring strength and mobility

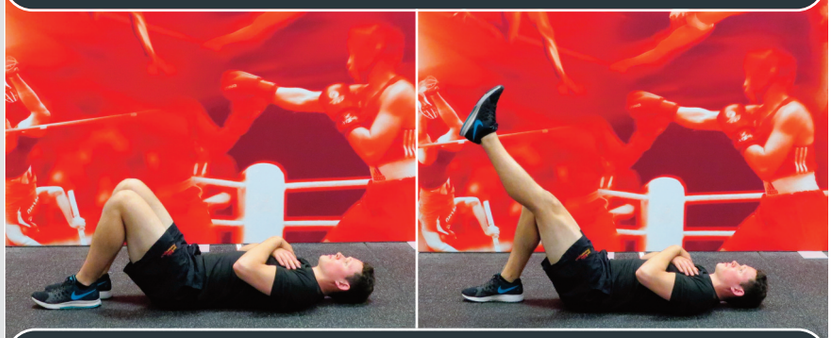
Note: It is important to identify any imbalances from left to right. If there are significant imbalances this may increase the risk of potential injury. Over time prioritise increasing the side with the lowest measurement or performance score to equal that of the highest scoring side. Aim for symmetry between left and right.

LOWER ABDOMINALS

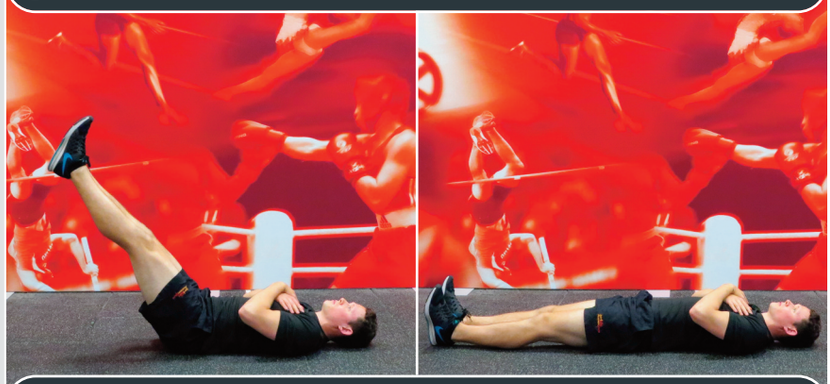
STRENGTH TESTING

SCORING

SET UP



START POINT



END POINT

LEVEL	REPS
Significantly above average	35
Above average	30
Average	25
Below average	20
Needs significant improvement	15

Technical Points

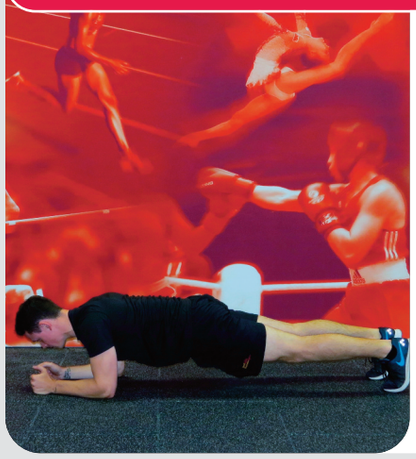
- Lower back flat on floor
- Pelvis neutral (level) - belly flat
- Brace abdominals (tension)

Common Errors

- Arching of the lower back
- Pelvis tilts - Belly raises during exercise
- Discomfort in lower back (regress exercise)

ABDOMINAL BRACING

ANTERIOR TRUNK TESTING



Set up

- ✔ Hips level – no pelvic tilt (right/left or forwards/backwards)
- ✔ Brace abdominals (tension)
- ✔ Back flat – hips, back and shoulders in line

SCORING

Significantly above average	140s
Above average	120s
Average	100s
Below average	80s
Needs significant improvement	60s

SCORE (SECONDS)	←80s	100s	→120s
Interpretation	Very poor anterior trunk strength	Average anterior trunk strength	Good anterior trunk strength
Intervention	Prioritise anterior trunk strengthening	Continue anterior trunk strengthening	Maintain anterior trunk strength

SIDE TRUNK TESTING

Set up

- ✔ Back flat - hips, back and shoulders in line
- ✔ Hips level – no pelvic tilt (right/left or forwards /backwards)
- ✔ Brace abdominals (tension)
- ✔ Hold position with no movement

SCORING

Significantly above average	120s
Above average	100s
Average	80s
Below average	60s
Needs significant improvement	40s

SCORE (SECONDS)	←60s	80s	→100s
Interpretation	Very poor side trunk strength	Average side trunk strength	Good side trunk strength
Intervention	Prioritise side trunk strengthening	Continue side trunk Strengthening	Maintain side trunk strength

KEY TAKE-HOME MESSAGES

- Athletes should demonstrate consistent movement competency before they are challenged with more complex or demanding exercises.
- Prioritising the development of AMSC prior to sport-specific training is important for long-term development and to help minimise the risk of injury.
- Regular testing and monitoring of athletes can be a useful way to help inform the training programme.
- During different stages of growth and development athletes will progress and regress at different rates. It is therefore important that a coach responds to the needs of the athletes in front of them. Athlete progression is rarely a linear process.

GLOSSARY

Athletic motor skill competencies (AMSC) - movement skills that form the basis of global movements, such as; running, jumping and throwing, and also allow for progression to more advanced athletic training.

Athleticism is the ability to repeatedly perform a range of movements with precision and confidence in a variety of environments, which require competent levels of; motor skills, strength, power, speed, agility, balance, coordination and endurance.

Bilateral exercises are performed using both sides of the body or both limbs at the same time. An example of this would be a double leg squat.

Bodyweight training is a form of training that requires athletes to manage body weight through movements that stress fundamental motor skills.

Exercise progression is the process of increasing the demands of a movement task, such as making a task more complex.

Exercise regression reflects the simplification of the demands of a movement task, such as making a task less complex.

Fundamental movement skills (FMS) are basic motor skills that are typically classified as locomotion, manipulation and stabilisation skills.

Growth Spurt is a term commonly used to describe periods of accelerated growth. Also know as Peak Height Velocity (PHV).

Flexibility is a term used to describe a muscles ability to lengthen.

Mobility refers to the range of movement around a joint or how the joint moves.

Sport-specific skills (SSS) are more advanced motor skills that are far more specific to actual sporting activities.

Technical competency is the ability of an individual to execute a skill with control and proficiency.

Unilateral exercises are performed using one side of the body or a single limb. An example of this would be a single leg squat.

REFERENCES

Lloyd, R.S. and Oliver, J.L. (2012). The youth physical development model: A new approach to long-term athletic development.Strength and Conditioning Journal, 34(3), 61–72.