2016

Field Testing Kit

TESTING PROTOCOLS

VERTICAL JUMP *(non-counter movement)*

Physical Factor	Lower body explosive power (LBP)
When to Test	• (YTP) – Early in preparatory phase and throughout annual plan within microcycles where there is no competition. • (Testing Day) – Early in testing session when body is fresh.
Equipment	• Vertical Jump Mat • Digital Monitor • Stopwatch

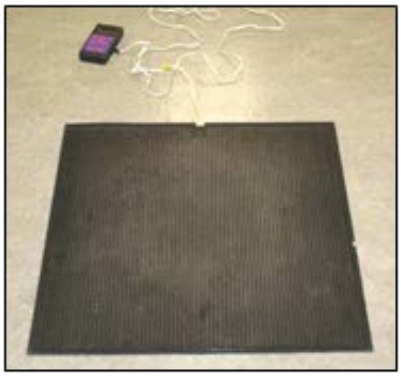
Purpose

Lower body power (LBP) is a key component in sports requiring dynamic movement. Typically, team and individual sports that involve quick acceleration utilize LBP as it facilitates jumping, bounding, quick changes in direction, and acceleration.

The vertical jump test measures overall jumping ability as it incorporates arm swing, trunk extension, and leg extension. Thus, this test reflects the athlete's motor skill coordination in addition to their knee and hip extensor muscle strength.

Important Considerations

- Try to find an area where there is good overhead clearance. The testing environment may require a ceiling height greater than 9 feet depending upon the height of the athlete.
- The jump mat measures jump height based on flight time during a vertical jump. The timer is triggered when the athlete's feet leave the mat and stops when the athlete has landed. This method of calculation assumes that the athlete's takeoff position and landing position are on the mat.
- Using the jump mat provides an opportunity to test a large number of athletes quickly and effectively.



VERTICAL JUMP *(non-counter movement)*

Protocol

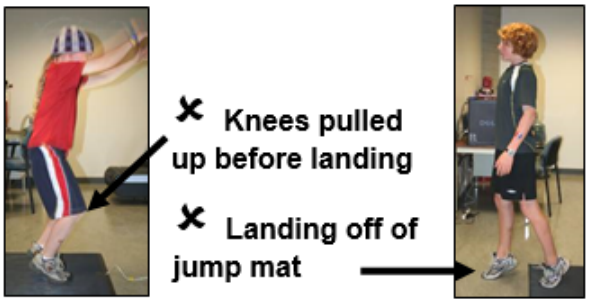
ADMINISTRATION	SET-UP
• Athletes should be divided into groups and allowed up to three opportunities to engage in the test. • Groups of no more than six athletes should be used to ensure that the athlete is warm and ready to perform each trial. • Two testers can be used to implement this test: one to read the feedback monitor and the other to record the scores. • The athlete should be allowed at least three trials (not including practice trials) with minimum 15 second recovery between each trial.	• Place jump mat on the floor and ensure that there is enough space around the athlete and head clearance for vertical jumping. • All wires should be secured with masking tape where necessary. • Turn on the jump mat monitor. When the display screen shows “JUMP 1 TIME”, press the pink button and follow the instructions on the monitor. • Position testers to the side and behind the athlete during the test to ensure adherence to protocols and to spot athlete after landing on mat.

Procedure

1. Athlete stands in middle of mat with fee shoulder width apart.
2. Athlete begins test in a squat position with arms back.
3. The athlete must pause in this position prior to jumping – no dipping of hips prior to jump.
4. Once the athlete explodes off the mat, legs must remain relatively straight until the landing.
5. The monitor will display athlete’s jump height (inches) and flight time (seconds). The athlete must remain on mat until score is recorded.
6. Athlete may be given feedback on jump after each trial.

Critical Points

- Ensure athlete is stationary prior to jump – no countermovement or ‘pre-jump’.
- Watch that athlete does not tuck knees up during jump in an attempt to increase flight time.
- Encourage athlete to jump for maximum height and to stay centred over jump mat.



SIT AND REACH

Physical Factor	Range of motion (ROM) around trunk and hips
When to Test	• (YTP) – Early in preparatory phase and throughout annual plan within microcycles regardless of competition. • (Testing Day) – After other testing protocols or toward end of a testing session.
Equipment	• Yoga mat • Sit and reach bench • Stop watch • Cleaning wipes

Purpose

Flexibility is an essential factor in all sports to enable proper technique, reduce chance of injury, and facilitate recovery. It is a measure of range of motion (ROM) around a particular joint or set of joints, and the need for flexibility will be sport and joint specific. Hamstring and hip flexibility can be compromised by sedentary activity in a seated position for long durations and therefore is an important factor that will affect performance in most sports.

The sit and reach test provides a general measure of flexibility around the trunk and the hips. However, the test is dependent on the growth and maturation of the athletes as limb length and proportions will affect results.

Important Considerations

- Athletes should engage in specific warm-up.
- Athletes should be organized so that they can quickly access the sit and reach bench after warm-up.
- Ability to hold test position is essential and jerky or ballistic movement should be avoided.

SIT AND REACH

Protocol

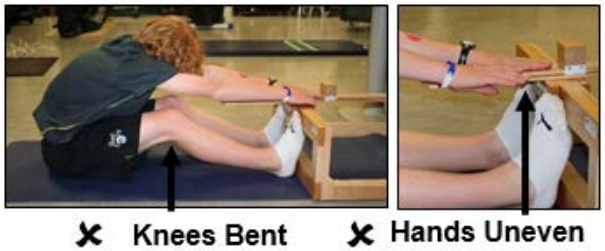
ADMINISTRATION	SET-UP
• Test is administered one person at a time. • Athlete must engage in a specific warm-up protocol requiring sequence of stretches which are held for 20 seconds. • Type and order of warm-up stretches are as follows: o Calves o Glutes o Hamstrings o Back • Athlete will engage in test three consecutive times with a 15 second rest between attempts.	• Sit and reach bench is placed against the wall. • Test is administered without shoes. • A yoga mat can be placed under the sit and reach bench. • Ruler arm is attached at 26cm – feet placed at 26cm mark.

Procedure

1. Athlete removes shoes and sits with legs fully extended.
2. The soles of feet are placed flat against the foot board of the sit and reach bench.
3. Balls of feet rest against foot board with a six inch gap between feet.
4. Athlete bends slowly forward with fully extended arms sliding the marker as far forward as possible without bouncing or jerking.
5. Athlete must hold endpoint position for minimum two seconds – lowering head will maximize stretch.
6. Repeat test three times and record maximum reading.

Critical Points

- Knees should be locked and arms evenly extended with palms facing down.
- Tester should not hold knees down.
- Do not allow bouncing or jerking.



LEGER-BOUCHER 20m SHUTTLE RUN *(beep test)*

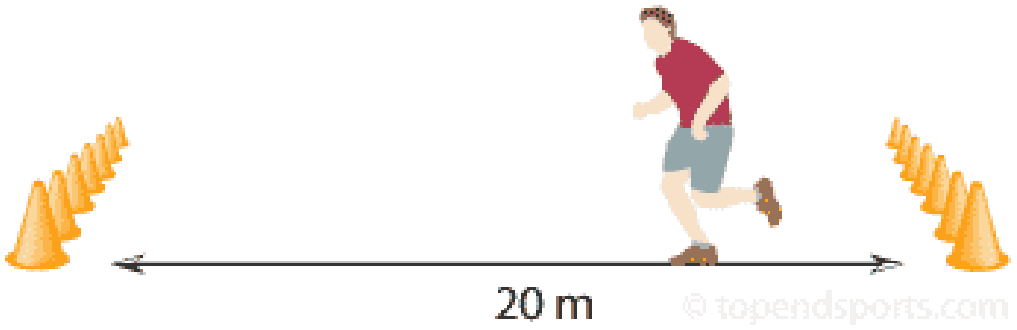
Physical Factor	**Maximal aerobic power (MAP / VO_2Max)**	
When to Test	• (YTP) – Early in preparatory phase and throughout annual plan where there is no competition. • (Testing Day) – Following tests that require maximal speed or power.	
Equipment	• 20m Shuttle Run CD • CD player • Stopwatch • Cones	• Masking tape • Long measuring tape • Extension cord and/or extra batteries

Purpose

Aerobic fitness is a key component in all sports. It facilitates recovery and provides a base for high intensity or repeated activity. Testing for aerobic fitness can be used to: develop training programs; monitor fatigue and overtraining; assist in periodization and long term athlete development; and identify strategies and tactics for competition.

Important Considerations

- Running this test indoors on a non-slip surface is best in order to minimize impact of environment on test score.
- This is a maximal test – 100% effort is required – so athletes must be in good physical health and prepared to work as hard as they can.
- Make sure athletes have not eaten any large meals for two hours prior to the test.
- This test is popular as it is simple and can be used to test a large group of athletes at the same time.



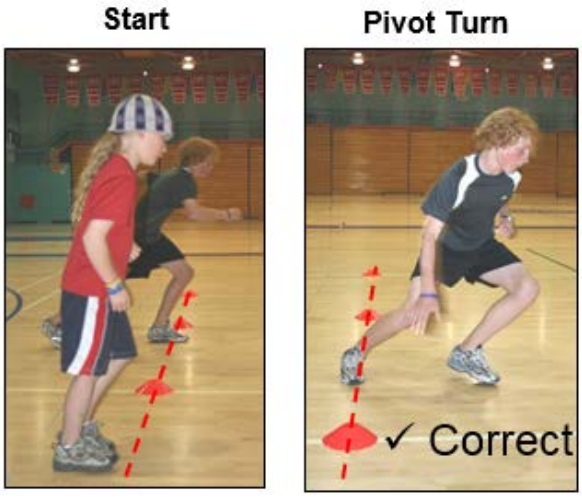
LEGER-BOUCHER 20m SHUTTLE RUN *(beep test)*

Protocol

ADMINISTRATION	SET-UP
• Administration depends upon number of athletes and size of testing area. • Ideally, athletes complete test in groups of 10 or less. • With a very large group and limited testers, divide athletes into two groups and pair them off so that first group runs and second group records results. • Best to have minimum two testers with one at each end of 20m area.	• Mark a start and end line using long tape measure to establish 20m distance. • Using cones, space athletes apart with a minimum of one metre between each on both ends of 20m area.

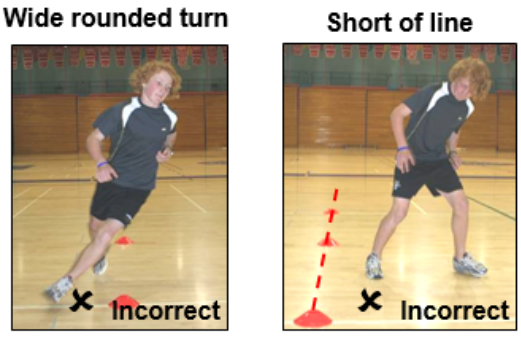
Procedure

1. Introduce test stating it is a maximal progressive test which starts out easy and gets harder – it is important to give 100% effort.
2. Demonstrate how test is run paying particular attention to running pace and turning. The foot must touch line and pivot to change direction. The athlete must reach other end and turn on the beep.
3. Turn to Track 4 of Shuttle Run CD.
4. Encourage athletes to follow pace as long as possible.
5. When athlete is unable to reach end line before the beep two successive times, the test is terminated and tester notes level achieved – the last complete shuttle and number heard on CD.
6. After test, do not let athletes sit or lie down. Have them recover by walking for minimum three minutes.



Critical Points

- Pivot, do not make wide turns.
- Athletes should not speed ahead and wait at the line, rather keep pace to arrive at line on the beep.
- Athletes must touch line in each shuttle, even if they are late.



ANTHROPOMETRY *(height and weight)*

Physical Factor	**Height and body mass**	
When to Test	• (YTP) – 2-4 times per year depending on age and growth rate of athlete (younger = more changes, more testing necessary; older = less changes, less testing necessary).	
Equipment	Height • Sewing tape measure • Masking tape • Set Square	Weight • Digital scale

Purpose

To chart the growth of an athlete over time. Long term goal is to see if there are any patterns or trends which can characterize sport-specific physical attributes.

Important Considerations

- Measurement of both height and weight needs to be on a flat, firm surface.
- Ensure calibration of both weight and height scales.
- Body mass will change during the day. The most stable values are generally obtained in the morning.

ANTHROPOMETRY *(height and weight)*

Protocol

ADMINISTRATION	SET-UP
• Test is administered one person at a time. • Often collected at the beginning of the testing session. Most efficiently done by conducting test as soon as athlete arrives. • Measurement order (height vs. weight) does not matter.	**Height** • Find wall that is unobstructed – ideally in a room with non-carpeted floor and no baseboards. • Measure one metre up wall and mark spot with piece of masking tape. • Position the zero end of measuring tape on the one metre mark and attach it vertically against wall using masking tape. • Ensure tape is as straight as possible. **Weight** • Place scale on flat, firm, level surface

Procedure

Height

1. Athlete removes shoes and stands straight with back against wall.
2. Arms should be hanging by their side, feet together. Heels, buttocks, upper back, and head touching wall.
3. Have athlete take deep breath in and hold.
4. Place Set Square firmly on the top of athlete's head.
5. Measure athlete's height from lower edge of set square.

Weight

1. Athlete should be in light clothing with shoes removed.
2. Have athlete stand on centre of scale their weight evenly distributed on both feet. Movement should be restricted.
3. Record weight in kilograms.

Critical Points

- Athlete should be looking forward and standing as straight as possible.

30M SPRINT

Physical Factor	**Acceleration and speed**	
When to Test	• (YTP) – Beginning and end of each training phase allowing assessment of the effectiveness training. • (Testing Day) – Early in the testing session when the body is fresh.	
Equipment	• Brower Timing Lights (minimum 2 'gates') • Long measuring tape • Masking tape	• Cones • Stopwatch • Spare batteries

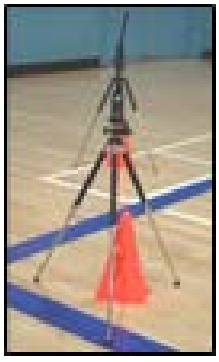
Purpose

Acceleration and speed are crucial requirements in many team and individual sports. Increase speed facilitates advantages over opponents and helps to move quickly into position in order to enhance tactics and technique.

This test examines two measures of speed: one is the ability to accelerate from a static position (1st 10m); the second is the ability to reach and sustain maximum linear speed (flying 20m). While various sports may prescribe different distances to measure speed, 30 metres provides an optimal distance which is typical of sprinting movements required in most sports.

Important Considerations

- Athletes should engage in specific warm-up.
- When conducting the test indoors, be sure to provide enough distance to stop after finish line.
- Timing lights may be used outside; however, they are not waterproof and cannot be used in the rain.
- Test can be conducted with 2 gates (30m sprint) or with 3 gates (1st 10m, flying 20m, 30m sprint).
- In small testing area, it may be necessary to run diagonally from corner to corner.



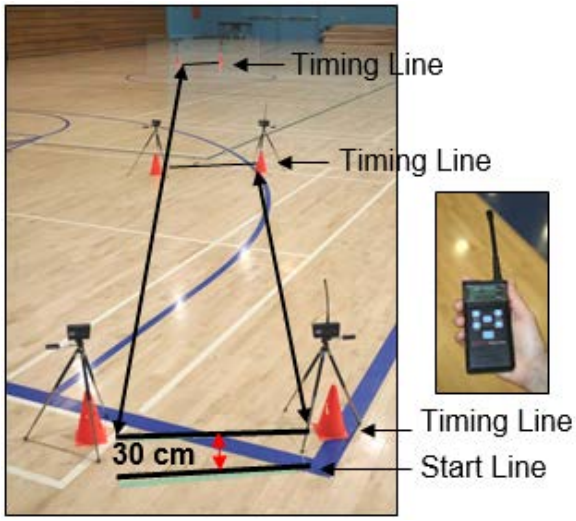
30M SPRINT

Protocol

ADMINISTRATION	SET-UP
• Test can be administered with a large number of athletes and recording of results is most efficient with at least two testers. • One tester should position themselves at the start of the 30m and another at the end. • Ensure athletes are well warmed up prior to the test including some practice sub-maximal accelerations. • Do a specific warm up by striding over 20m building in intensity from 85% to 100% maximum with a jog recovery. Then do four sprints from a stationary start over 10m building in intensity from 90% to 100%. • Athletes should rotate through test to ensure adequate rest between sprints (minimum 90 seconds). • Athlete should be given three attempts to achieve fastest time.	• Mark timing lines for the first gate (0m), second gate (10m – if applicable), and third gate (30m) with masking tape. Each timing line should be between 2-10 metres apart from each other. • Ensure timing lines are positioned at the same distance on both sides where gates are to be placed. • Mark a start line 30cm (one foot) back from the first timing line. • Position each timing light directly over timing line approximately 50cm-70cm above the floor. • Once in position, turn timing lights on by pressing button on back. The lights will make a continuous, loud beep when not properly aligned or if something is breaking the beam.

Procedure

1. Athlete starts in a staggered stance with foot of choice on start line.
2. Athlete may start when ready (eliminating reaction time to a visual or auditory clue).
3. Timing will start when athlete breaks the beam on first gate.
4. Athlete sprints as fast as possible through to the finish line making sure not to slow down before crossing line.
5. Fastest 30m time is recorded which will have first 10m and flying 20m (where applicable). All three numbers should come from same trial.



Critical Points

- Athletes must sprint through the final set of timing lights.
- Start low with quick steps, then lengthen out.
- Use arms to maintain linear momentum.

T-TEST

Physical Factor	**Agility**	
When to Test	• (YTP) – Beginning and end of each training phase allowing assessment of the effectiveness training. • (Testing Day) – Early in the testing session when the body is fresh.	
Equipment	• Brower Timing Lights • Long measuring tape • Masking tape	• Cones • Stopwatch • Spare batteries

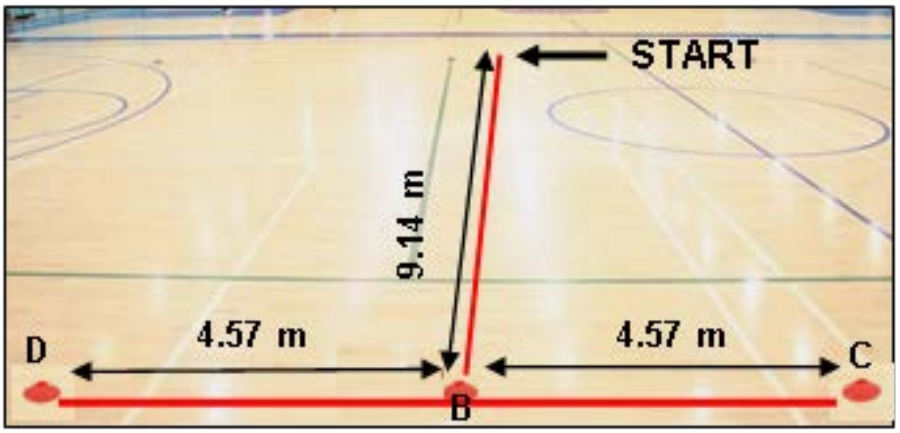
Purpose

Agility and quickness are critical factors in many team and individual sports. Agility measures an athlete's ability to rapidly change direction and position in a horizontal plane. It is a combination of rapid changes in direction, visual processing, timing, reaction time, perception, and anticipation. Increased agility facilitates advantages over opponents and helps to move quickly into position in order to enhance tactics and technique.

The T-Test is a measure of four-directional agility and body control that evaluates the ability to quickly change directions and maintain balance while moving as quickly as possible.

Important Considerations

- Athletes should engage in specific warm-up.
- Measurement can be done by either timing lights or stopwatch.
- Ensure enough space behind start/finish line so athlete has room to stop when running backward.



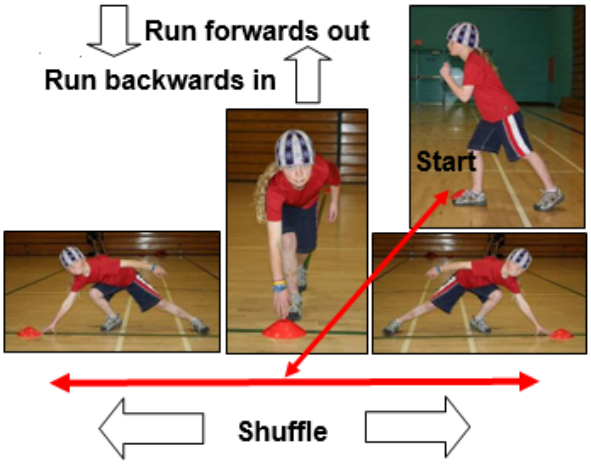
T-TEST

Protocol

ADMINISTRATION	SET-UP
• Ensure athletes are well warmed up prior to the test including some practice sub-maximal accelerations. • Do a specific warm-up that includes rapid changes in direction and other movement patterns that are used in the test such as side shuttles and running backward. • Athletes may practice test pattern prior to test. An additional 'practice station' may be helpful. • Athletes should rotate through test to ensure that there is adequate rest between sprints (a minimum of 90 seconds). • Athlete should be given two attempts to record fastest time. • When using stopwatch, place tester at the start/finish line.	• Select a starting line, measure out 9.14 metres (10 yards), and place a cone. • Measure 4.57 metres (5 yards) perpendicular to cone (on each side) and place another two cones. The final result should look like a "T". • If using timing lights, ensure the gate is at the start line and placed at a height where the light beam cannot be broken by hands or arms.

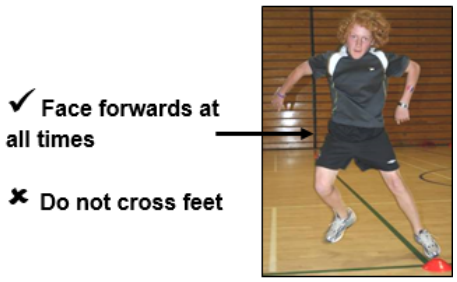
Procedure

1. Athlete starts in a staggered stance with foot of choice on start line. Athlete may want to experiment with optimal lead foot.
2. Athletes start on auditory cue.
3. Athlete sprints forward (9.14m) to centre cone and touches it.
4. Athlete shuffles to the left (4.57m) and touches cone.
5. Athlete shuffles to the right (9.14m) and touches far cone.
6. Athlete shuffles to the left (4.57m) and touches centre cone.
7. Athlete runs backward (9.14m) to starting line.



Critical Points

- Always face forward during the test.
- Shuffle between cones – no crossing over of the feet.
- Touch each cone with nearest hand.



PARTIAL CURL-UP

Physical Factor	**Abdominal Muscular Endurance**	
When to Test	• (YTP) – Early in the preparatory phase and throughout annual plan within microcycles where there is no competition. • (Testing Day) – After tests requiring ballistic movements, but before tests requiring high energy outputs.	
Equipment	• Yoga mat • Measuring tape • Metronome	• Masking tape • Hand counter • Cleaning wipes

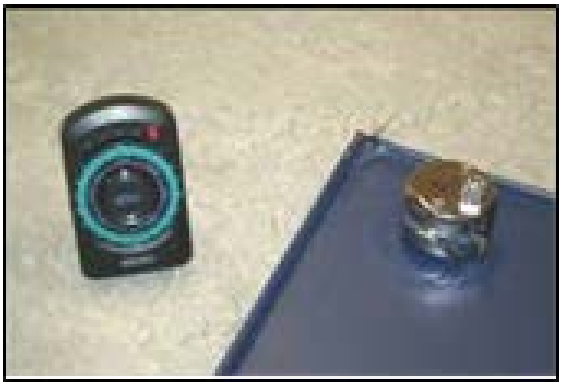
Purpose

The abdominal muscles, in combination with the back muscles, are essential to help stabilize the body during sport activity. Well-developed core muscles are critical in transferring lower-body energy that promotes effective movement for locomotion, object control, balance, and dynamic movement. In addition, abdominal muscles are essential for maintaining posture, and are a foundation of movement and injury prevention.

The partial curl-up test provides an indicator of abdominal muscular endurance and may help to promote this muscle group in general fitness preparation.

Important Considerations

- Test is to be done in a large enough space that athletes have enough room between them to successfully engage in test.
- Ensure all athletes are in a position to hear the metronome.



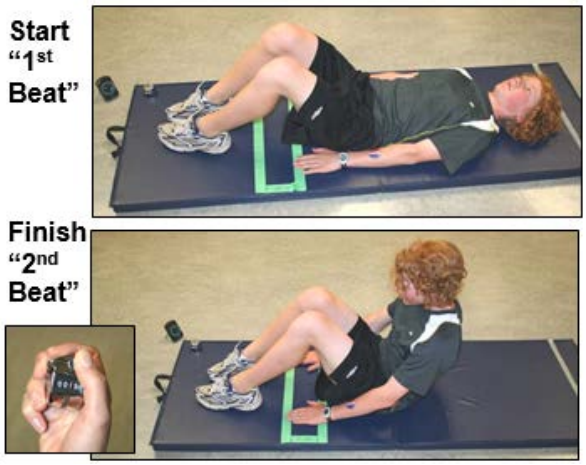
PARTIAL CURL-UP

Protocol

ADMINISTRATION	SET-UP
• Test can be administered with a group of athletes placed in a circle or a row – it is imperative all athletes can hear the metronome. • If test is done with a single athlete, a hand counter can be used to count repetitions. If done in a group, each athlete should be paired with someone to track repetitions.	• Place two strips of masking tape across the mat, approximately 1/3 of the way down, 10 centimetres apart. • Set metronome at 50 beats per minute.

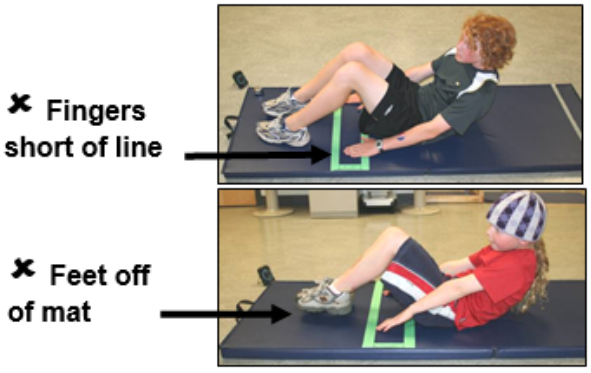
Procedure

1. Athlete lies back-down on the mat (supine position) – arms full extended, head resting on mat, and palms face down.
2. Longest finger on each hand should be touching the inside edge of the nearest strip of masking tape.
3. Athlete bends knees at 90 degrees with legs hip-width apart.
4. Athlete begins test on first beat of metronome curling up so that the longest finger reaches the inside edge of the second strip of masking tape (10cm).
5. On next beat, athlete curls back to start with head and shoulders on mat and fingertips on original tape mark.
6. Continue curling up and down on metronome beats at a rate of 25 curl-ups per minute.
7. Test ends when athlete can no longer perform curl-up on metronome beat and final number is recorded.



Critical Points

- Feet must stay flat on mat at all times.
- Fingers must reach second line of tape.
- Athletes must maintain 50bpm cadence.
- Head and shoulders must touch mat at end of each repetition.



PACED PUSH-UP

Physical Factor	Upper-body muscular endurance
When to Test	• (YTP) – Early in the preparatory phase and throughout annual plan within microcycles where there is no competition. • (Testing Day) – After tests requiring ballistic movements, but before tests requiring high energy outputs.
Equipment	• Yoga mat • Metronome • Hand counter • Cleaning wipes

Purpose

Upper-body development is essential in all sports. Optimal upper-body conditioning is critical to: provide stability during movement; generate force to propel objects; maintain positioning against an opponent; and assist in maintaining repetitive upper body movements.

The paced push-up test uses several large muscle groups that are involved in most sports. The test not only recruits the muscles required to perform the movement, but it also uses muscles involved in stabilizing the body's core in order to maintain proper technique.

Important Considerations

- Test is to be done in a large enough space that athletes have enough room between them to successfully engage in test.
- Ensure all athletes are in a position to hear the metronome.

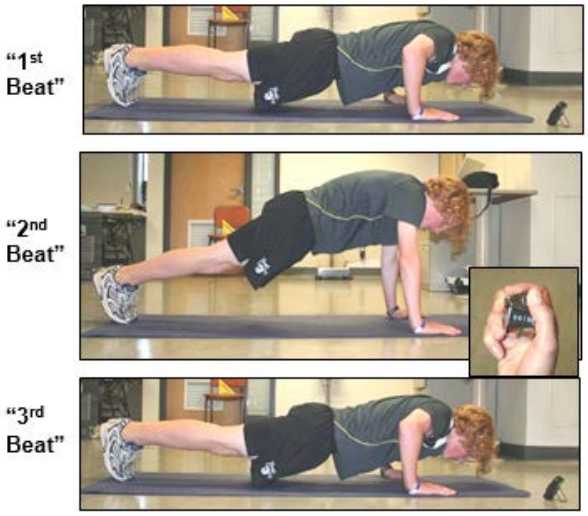
PACED PUSH-UP

Protocol

ADMINISTRATION	SET-UP
• Test can be administered with a group of athletes placed in a circle or a row – it is imperative all athletes can hear the metronome. • If test is done with a single athlete, a hand counter can be used to count repetitions. If done in a group, each athlete should be paired with someone to track repetitions.	• Set metronome at 40 beats per minute.

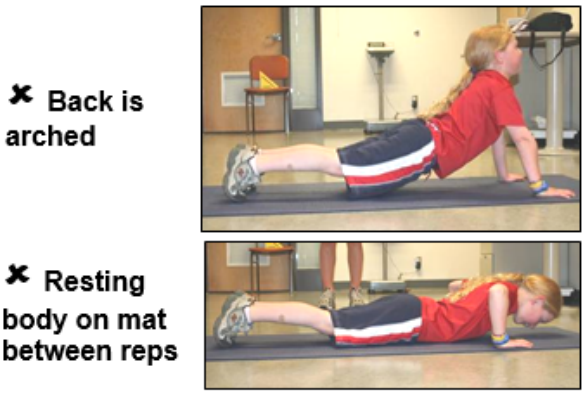
Procedure

1. Athlete lies on stomach – legs together and hands pointing forward under the shoulder.
2. On first beat of metronome, athlete pushes straight up until arms are fully extended with toes acting as pivot point. Upper body should remain in a straight line.
3. On second beat, athlete lowers body from full extension toward floor in a controlled manner.
4. Elbows must return to 90 degrees to complete repetition.
5. Athlete repeats motion on metronome beats.
6. Test ends when athlete can no longer perform push-up on metronome beat and final number is recorded.



Critical Points

- Maintain straight back.
- Maintain pace to the beat of the metronome.
- Ensure athlete breathes throughout the movement – exhaling on the up movement and inhaling on the down.



URINANALYSIS

Physical Factor	Hydration
When to Test	• YTP • (Testing Day) – First thing in the morning OR pre-/post- exercise when measuring effect of dehydration.
Equipment	• ATAGO Pocket Refractometer • Small container • Distilled water • Cloth / Disposable wipes

Purpose

Monitoring hydration levels to prevent dehydration is important for optimizing performance. Urine specific gravity is a scientific measure of hydration by measuring the density (concentration) of a urine sample[1].

Urinalysis, through the use of a refractometer, has been shown to be the most valid and reliable method for determining moderate changes in fluid balance[1].

Important Considerations

- Medicines, vitamins, supplements, etc. may cause the urine specific gravity to change and give incorrect readings of dehydration leading to the test being unreliable.
- Test requires collection of urine which can be difficult and require patience in some cases.

[1] topend sports, http://www.topendsports.com/testing/tests/urine-refractometer.htm. Retrieved April 13th, 2016.

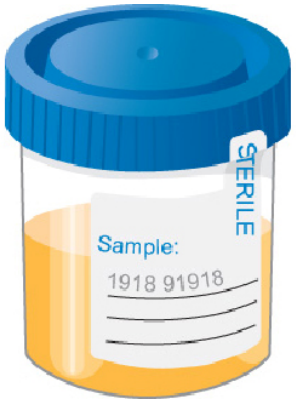
URINANALYSIS

Protocol

ADMINISTRATION	SET-UP
• Test can be administered to any number of athletes with just one refractometer provided it is properly cleaned after each reading. • Very little urine is required for testing sample. • Each athlete will require their own container for collecting sample. • Samples can be measured immediately upon collection or stored for later measurement.	• Calibrate refractometer by putting distilled water onto glass and adjust scale so that reading is 1.000.

Procedure

1. Athlete takes sample collection container into private area.
2. First part of stream is discarded, then athlete collects small sample of urine in container.
3. Turn on refractometer and press “Zero” so that the monitor reads 1.000.
4. Place a drop of urine onto glass ‘eye’ and press “Start”.
5. Refractometer reading should range from 1.000 (very hydrated, equivalent to water) to 1.035 (very dehydrated).



Critical Points

- Ensure athletes discard first part of stream for reliable testing.
- Wipe Refractometer after each use.
- Calibrate prior to first test and after every 10 tests (approx.).