Karate Fitness Testing Manual

Field Test Protocols

Purpose: The standardized karate athlete 'field test' is an easy-to-use tool for clubs who wish to monitor their members fitness levels. A club may decide to collect or not data for their own internal records. No data from any field test needs to be reported to Karate BC. The field test should also be used as a tool to prepare competitive athletes for a related Karate BC Team 'performance test' which will evaluate more in depth fitness parameters.

Reasons for testing: To date there is no valid and reliable fitness testing battery of a karate athlete's physiological parameters. Therefore, the goal of the field fitness test is threefold: (1) to establish a valid and reliable fitness test that can be implemented to karate athletes, (2) to determine talent identification systems based on the fitness testing outcomes (i.e. create "athlete profiles"), and (3) to establish normative data on karate athletes.

A *fitness test* evaluates an athlete's physiological parameters. This is different from a *skill assessment* which tests psychological & sport specific skills. A karate athlete *skill assessment* will be developed at a later date.

Background: In 2016, ViaSport conducted a complete review of Karate BC and it highlighted the need to establish both fitness testing and athlete evaluation of the BC Team. This field test prepares athletes in their clubs for the 'performance test' for BC Team athletes, which will be conducted at the start and end of the 2016-2017 competitive season. The athlete data will be part of a multi-year longitudinal study piloted by Karate BC & Karate Canada in conjunction with the University of Victoria's Exercise Science (Kinesiology) program. Kalan Anglos will conduct this pilot project as part of his master's thesis research. The multi-year longitudinal study allows Karate BC and Karate Canada to gather data on a variety of karate athletes to help determine fitness norms and create athlete profiles.

Physiological Parameters to be Measured:

1. Anaerobic Power: Also known as "high-speed muscular strength", this parameter measures the ability of a muscle to exert high force while contracting at a high speed. These tests are short in duration, performed at maximal movement speeds. **Tests: kneeling medicine ball toss, standing long jump**
2. Anaerobic Capacity: is the maximal rate of energy production and the ability to maintain a high energy output over an extended period of time. These tests typically last from 1 – 2 minutes, and measure the ability to maintain the usage of the anaerobic energy systems. **Test: 300 metre shuttle**
3. Agility: is the ability to stop, start, and change directions as rapidly as possible and in a controlled manner. Athletes who are performing agility tests typically change direction, and are timed on their ability to do so. **Test: T -test**.
4. Aerobic Power/Capacity: is the ability for an athlete to maintain performance primarily using the aerobic energy system. These tests are generally done by determining an athlete's endurance, and there are a variety of tests that can be used, many of which give a score of oxygen consumption (measured in ml.kg.min). For tests in a club setting, aerobic tests can be done using minimal equipment, and a predicted oxygen consumption (VO2max score) can be determined. **Test: Miller 20 metre run test**
5. Flexibility: is the range of motion a certain joint has. This can be measured in a variety of different ways, and is important for karate athletes to ensure they have adequate flexibility (in the shoulders and hips/legs primarily) to execute certain karate techniques. **Test: Split test**.

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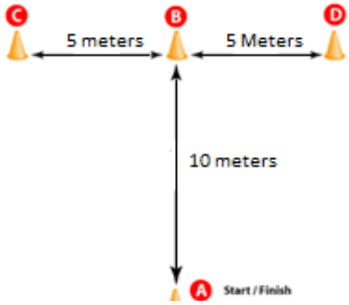
Test Protocol Explanations

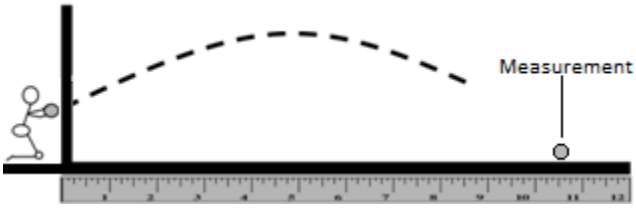
1. Flexibility – **Split Test**

   Procedure: Prior to the test, athlete's leg length is determined by measuring from their heel to the hip protrusion (iliac spine) with a straight leg. On a marked area, the athlete stands and places their heels in **front** of the measuring line. They perform a split stretch and the distance between the **inside** of their heels is determined. Their stretch distance is then subtracted by their leg length (*example: 160cm stretch – 110cm leg length = 50cm difference*). Positive or negative scores may be obtained.

2. Agility – **"T-Test"**

Procedure: Set out four cones as illustrated in the diagram. The subject starts at cone A. On the command of the timer, the subject sprints to cone B and touches the base of the cone with their **right** hand. They then shuffle sideways to cone C (remaining facing forwards, and shuffling feet heel-to-heel – not crossing), and also touches its base, this time with their **left** hand. Then shuffling sideways to the right to cone D and touching the base with the **right** hand. They then shuffle back (still facing forward) to cone B touching with the left hand, and run backwards to cone A. The stopwatch is stopped as they pass cone A.	

3. Anaerobic Power (Upper Body) – **Medicine Ball Throw**



Procedure: The athlete starts in a kneeling position, with thighs parallel and the knees at the start line. Ensure that the toes are pointed backwards (plantar flexed), as curled up (dorsi flexed) toes can be used for greater traction. Start with the ball grasped with both hands at the chest with the hips brought back to the heels, then in one motion the ball is pushed forward and up (optimally between 30-45 degrees). They must not throw favoring one arm or rotate about the spine. The athlete is permitted to fall forwards over the line after the ball is released. The knees are not to leave the ground. Weight Guidelines: **Females**: 6kg **Males**: 9kg **Youth**: 4kg

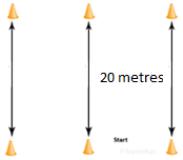
Anaerobic Power (Lower Body) – **Standing Long Jump**

Procedure: The athlete stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts are allowed.	

4. Anaerobic Capacity – **300 metre Shuttle**

   Procedure: Marker cones or lines are placed 10 metres apart to indicate the sprint distance. Start with a foot on or behind one line. When instructed, the athlete runs to the opposite 10-metre line, touches it with their foot, turns and run back to the start. This is repeated 15 times (20 metres X 15 laps = 300 metres total) without stopping.

5. Aerobic Power/Capacity – **Miller 20 metre run test**

Procedure: This test is similar to the 300m shuttle test, however it measures aerobic capacity because it usually primarily the aerobic energy system. It is a modified version of the Leger 20m ("beep test") but measures distance covered instead of stages completed. Marker cones are placed 20m apart to indicate sprint distance. When instructed, the athlete runs to the opposites 20m line, touches it with their foot, turns and runs back. This is completed as many times as possible in a span of 5 minutes. Upon finish, total distance is determined (20m X # of laps). Only laps COMPLETED in 5 minutes are counted towards the total distance covered.	

Score Sheet

Athlete's name_____ **Age:** _____ Years

Date _____ **Time** _____ **Weight:** _____ kg

Location _____ **Resting HR:**_____ bpm

Equipment	**Safety Consideration**
- Measuring Tape or athletic tape with measurement markers - Cones/Pylons - Stopwatch - Scale and stadiometer (height measurement tool) - HR monitors (optional)	- 15 minute light warm-up prior to test - Athlete's inexperience in testing protocols - Athlete fatigue - Spatial Awareness - 10 minute cool down

Score sheet

Test	First Trial	Second Trial*
Flexibility (split/leg length diff.)	cm†	cm
T-Test	seconds‡	seconds
Kneeling Medicine Ball Throw	cm	cm
Standing Long Jump	cm	cm
300 metre Shuttle	seconds	seconds
Miller 20 metre run test	metres covered	metres covered

* On test days, at least 3 minutes should be given between first and second trials (where applicable)

† For tests that measure distance (centimetres), round scores to the nearest whole cm (*example: 164cm*)

‡ For tests that measure time, round scores to the nearest 0.1 seconds (*example: 24.3 seconds*)

Implementing the Test:

If entire test battery is being done on the same day, the order of assessment should follow the way it is presented. If only individual tests are being done, or tests are being done on separate days, then order of assessment should follow the guidelines specified below.

Order of Assessment (2 day testing)

Day 1	Day 2
Flexibility Test	T-Test
Kneeling ball toss	Standing long jump
300m shuttle test	Miller 20m run test

Order of Assessment (3 day testing)

Day 1	Day 2	Day 3
Flexibility Test	T-Test	Kneeling med ball toss
300m shuttle	Standing long jump	Miller 20m run