



# **Module 2: Football-specific Physiological Testing**



## Table of Contents

<b>1. Introduction</b> .....	<b>3</b>
<b>1. Pre-participation screening</b> .....	<b>3</b>
<b>2. The training status of the athlete</b> .....	<b>10</b>
<b>3. Testing order guidelines (if testing a number of fitness components in the same session)</b> .....	<b>10</b>
<b>4. Anthropometry</b> .....	<b>11</b>
<b>4.1. Body Mass Index (BMI)</b> .....	<b>11</b>
<b>4.2. Height (cm)</b> .....	<b>11</b>
<b>4.3. Weight (kg)</b> .....	<b>12</b>
<b>4.4. Skinfold measurements</b> .....	<b>12</b>
4.4.1. Triceps .....	13
4.4.2. Biceps .....	13
4.4.3. Subscapular .....	14
4.4.4. Supra-iliac.....	14
4.4.5. Calf.....	15
4.4.6. Thigh.....	15
4.4.7. Abdominal .....	16
<b>4.5. Girth measurements</b> .....	<b>16</b>
4.5.1. Relaxed arm.....	16
4.5.2. Contracted arm .....	16
4.5.3. Chest.....	17
4.5.4. Waist.....	17
4.5.5. Hips.....	17
4.5.6. Calf.....	17
4.5.7. Mid-thigh.....	17
4.5.8. Forearm .....	17
<b>4.6. Derived measurements</b> .....	<b>17</b>
4.6.1. Body fat .....	17
4.6.2. Sum of Skinfolds .....	18
4.6.3. Body fat percentage .....	18
4.6.4. Muscle mass .....	19
4.6.5. Calculating Muscle mass .....	21
<b>5. Flexibility</b> .....	<b>21</b>
<b>5.1. Rules of flexibility measurements</b> .....	<b>21</b>
<b>5.2. Straight-leg raise test for hamstrings flexibility</b> .....	<b>22</b>
<b>5.3. Thomas test (hip flexors and quadriceps)</b> .....	<b>23</b>
<b>6. Evaluation of Mobility and Stability</b> .....	<b>25</b>
<b>7. Muscular strength</b> .....	<b>27</b>

7.1. Bench press .....	27
7.2. Back squat .....	28
8. Muscular power .....	30
8.1. Vertical jump test .....	30
9. Muscular endurance .....	31
9.1. 1-minute push-ups test .....	32
10. Speed .....	33
10.1. 10 and 40 m sprint .....	33
11. Agility .....	34
11.1. Illinois agility test.....	34
12. Aerobic capacity .....	36
12.1. Yo-Yo Intermittent Recovery test .....	36
12.2. Multistage shuttle run (Bleep test) .....	38
13. References.....	39
14. Appendix A: Pre participation screen.....	42
15. Appendix B: Consultation and informed consent form examples .....	46
16. Appendix C: Normative data collected at the SSISA .....	50
17. Appendix D: Data capture sheet for Multistage shuttle run (bleep test).....	51
18. Appendix E: Table of predicted maximum oxygen uptake values for the multistage fitness test.....	52

## 1. Introduction

A football-specific physiological test battery may be used to identify areas of strength or weakness in a player's physiological profile. Physiological testing is usually conducted at the start of the off-season, with re-assessments being performed at the start of the pre-season phase.

The benefit of conducting such physiological tests at the start of the off-season is that the player (and coach/trainer) will be able to determine which physical attributes the player should focus on during the off- and pre-season training phases, and which physical attributes may be used to their tactical advantage during the competitive season.

Another benefit of recording baseline performance measures is that should the player sustain an injury during the course of the season, the trainer and coach will have an objective score to use as an indicator of how close the player is to returning to baseline level from injury.

A typical physiological test battery consists of several assessments, which focus on the different components that make up basic soccer fitness. These include:

- Anthropometry (body shape and size)
- Flexibility
- Mobility and Stability
- Muscular strength
- Muscular endurance
- Speed
- Agility
- Aerobic capacity

All the tests described are for players over the age of 16. Prior to looking at the tests themselves, we will firstly look at the pre participation screen and consent.

## 2. Pre-participation screening

The pre-participation screening is possibly the most important step in the performance testing procedure. The pre-participation screening should be completed before any of the testing begins and generally occurs in the initial consultation with the client or team.

The objectives of the pre-screening for performance testing are as follows:

- To clear the participant of any risk factors that could be associated with placing them at risk during maximal testing (testing that takes an individual's heart rate above 76 % of their age-predicted maximum).
- To establish a detailed training history to assess if they are sedentary or active.
- To get an idea of the participant's goals and to decide on the final test battery that would be appropriate for the specific individual.

It is important for the trainer to remember that the pre-participation requirements for maximal exercise testing are different to those for starting exercise. Most people will be able to start exercise (this is the goal of most people who join a gym and many of them are sedentary) with a prescription of low or moderate activity. The difference with performance testing is that a participant will be required to perform exercise at a maximal level and therefore the pre-participation guidelines need to be of a more stringent nature.

The American College of Sports Medicine (ACSM) has established certain criteria in order to ensure that athletes are properly pre-screened before participating in maximal exercise to avoid catastrophic events that may arise from cardiac, pulmonary, metabolic or musculoskeletal abnormalities (Ferguson 2014).

The ACSM have recently updated their pre-participation screening standards. The new pre-participation screening process differs from the old one in several ways mentioned in the table below. The new screening aims to identify the following individuals:

- Those who should receive medical clearance before starting an exercise programme.
- Identify individuals with clinically significant diseases that may benefit from participating in a medically supervised exercise programme.
- Identify medical conditions that may require exclusion from exercise programmes until the conditions are under control.

- Previous ACSM guidelines were based on 1) the number of Cardio Vascular Disease (CVD) risk factors 2) presence or signs and symptoms of known CVD, pulmonary, renal and metabolic disease.
- The CVD risk factor profile is no longer included in the decision making process for referral to a health care provider.
- The classification of individuals as low , medium or high risk is no longer included, instead only specific individuals are referred to a health care provider to receive clearance to participate in exercise.

The objectives of the pre-screening for performance testing are as follows:

- To clear the participant of any risk factors that could be associated with placing them at risk during maximal testing (Maximal testing is an assessment that takes an individual's heart rate above 76 % of their age-predicted maximum or > 60% of Heart rate reserve (HRR)).
- To establish a detailed training history to assess if they are sedentary or active.
- To get an idea of the participant's goals and to decide on the final test battery that would be appropriate for the specific individual. A detailed **pre-participation form** should be filled out before an assessment (**Appendix A**). A **consultation form** should be filled out and **consent form** should also be signed by the participant indicating they are aware of the risks associated with maximal testing and have provided the trainer with all the relevant medical information prior to testing (**Appendix B**).