TESTING EFFORT CAPACITY OF FOOTBALL PLAYERS

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Abstract
The latest research and scientific information increasingly makes its way in the sports world. Several professional football teams in the country and abroad began to equip their players during trainings with a device called GP Sports SPI IQ having the size of a mobile phone, worn between shoulder blades. Such a device is equipped with a GPS, gyroscope, magnetometer, accelerometer and a heart monitor. This device allows coaches to track in real time the effort made by players, to measure distance, speed and acceleration capability, many data helping them to identify the strengths and weaknesses of each player.

Keywords: football, training, effort capacity and GP Sports SPI IQ.

JEL classification: I19, I20

Content
Being known for more than 100 years, the football has undergone during this period many transformations in the plans composing it, becoming a social phenomenon. Performance football represents today a means by which nations affirm their biological and psychic potential, as well as their educational, organizational and economic effectiveness.

In order to achieve the desired performances in football, the highest scientific achievements in this field and in other related sciences are allocated. The use of science in football must be permanent and systematic.

Modern science proofed with many arguments that between physical development of the individual and the capacity of assimilation and exploitation of knowledge there is a strong correlation and dialectical interdependence (Mănescu, D.C., 2014, p.8). Football is a sport requiring an intense physical effort, the alternation between strain/effort phases and the recovery/replenish phases repeating at variable time intervals.

In modern football, the intensity of physical effort has increased and must be maintained for as long as possible, depending on the target set. Depending on the requirements and characteristics of the current football, physical training directly interacts and influences the physical and tactical, biological and psychological

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training. A tactical concept is achieved only if there is an optimal basis of physical training doubled by appropriate volitional and intellectual capacities.

Football game is one of those sports in which acyclic movements are predominant. During a football game there are different distances and intensity of running, which indicates us that a football player must train with all three types of exercise (aerobic, lactacid anaerobic, alactacid anaerobic).

Research and scientific information prevail, thus leading to performances taken over from athletics and gymnastics, to a high-level physical training, becoming itself a science. This sport must be given a special importance both in terms of training future football players and in terms of competition, of affirmation/promotion, nationally, and more especially internationally.

Sensors become popular in the sports world as well. Several professional football teams in the country and abroad began to equip their players during trainings with a device called GP Sports SPI IQ having the size of a mobile phone, worn between shoulder blades. Such a device is equipped with a GPS, gyroscope, magnetometer, accelerometer and a heart monitor. This device allows coaches to track in real time the effort made by players, to measure distance, speed and acceleration capability, many data helping them to identify the strengths and weaknesses of each player.

GP Sports Systems uses advanced electronic and software engineering to provide coaching and training staffs the tools for understanding an athletes physiological responses under different training and competitive regimes as well as the athletes response over the course of a season or career.

GP Sports features the Sport Performance Indicator High Performance Unit a wireless wearable device, incorporating GPS heart rate and accelerometer technology, to collect and display speed, time, distance, positional data, altitude, and heart rate.

Use the SPI Touch app on your mobile phone and you can view live player speed, distance, heart rate and body load information along with team information (figure 1).

You can track workloads completed by the entire team or by groups within the team and view intensity graphs showing which players have done the most (and least) work. The SPI Touch is an essential addition to our real time performance products.
With the support provided by Professor Nicolae Constantin, I was able to make these measurements during a friendly match between the teams of Youth 2 CSS1 and Sportul Studentesc (table 1).

![Figure 1](image)

Nominal table with the pulse level and “quality of running” found out in the match of May 2014 … with GPSPORT {CSS 1 field}

CSS1 group ’98 <= Sportu’ ’98 friendly match with referees – 9:45 hour
Testing Effort Capacity of Football Players

<table>
<thead>
<tr>
<th>No.</th>
<th>Name and &quot;play position&quot; in the team</th>
<th>Pulse min</th>
<th>Max. speed</th>
<th>Pulse max.</th>
<th>Total distance in meters</th>
<th>Total time in min.</th>
<th>Vam 15 4.5, 5.3 m/s</th>
<th>Vam 19 5.3–7.1 m/s</th>
<th>Vam 29 7.2–8.8 m/s</th>
<th>Anaerobic plateau &gt;1650 bpm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>R.A., central midfielder</td>
<td>83</td>
<td>8.1</td>
<td>199</td>
<td>6400 m</td>
<td>6'4''</td>
<td>25 m</td>
<td>272 m</td>
<td>11 m</td>
<td>44 min.</td>
</tr>
<tr>
<td>2</td>
<td>M.M., right midfielder</td>
<td>83</td>
<td>7.5</td>
<td>198</td>
<td>4330 m</td>
<td>30''</td>
<td>115 m</td>
<td>131 m</td>
<td>8 m</td>
<td>13 min.</td>
</tr>
<tr>
<td>3</td>
<td>M.C., central defender</td>
<td>83</td>
<td>7.5</td>
<td>215</td>
<td>6850 m</td>
<td>70''</td>
<td>155 m</td>
<td>150 m</td>
<td>0 m</td>
<td>60’ 30''</td>
</tr>
<tr>
<td>4</td>
<td>T.C., left midfielder</td>
<td>60</td>
<td>7.5</td>
<td>197</td>
<td>2300 m</td>
<td>31''</td>
<td>62 m</td>
<td>128 m</td>
<td>7 m</td>
<td>14 min.</td>
</tr>
<tr>
<td>5</td>
<td>D.Y., attacker</td>
<td>79</td>
<td>7</td>
<td>209</td>
<td>4000 m</td>
<td>37''</td>
<td>215 m</td>
<td>165 m</td>
<td>0 m</td>
<td>34 min.</td>
</tr>
<tr>
<td>6</td>
<td>L.I., attacker</td>
<td>60</td>
<td>7</td>
<td>204</td>
<td>4150 m</td>
<td>35''</td>
<td>144 m</td>
<td>152 m</td>
<td>0 m</td>
<td>31 min.</td>
</tr>
<tr>
<td>7</td>
<td>M.I., left defender</td>
<td>120</td>
<td>6.5</td>
<td>206</td>
<td>3800 m</td>
<td>35''</td>
<td>159 m</td>
<td>165 m</td>
<td>0 m</td>
<td>32’ 30''</td>
</tr>
<tr>
<td>8</td>
<td>E.N., central defender</td>
<td>105</td>
<td>5.3</td>
<td>211</td>
<td>4900 m</td>
<td>52''</td>
<td>181 m</td>
<td>181 m</td>
<td>0 m</td>
<td>33’ 30''</td>
</tr>
<tr>
<td>9</td>
<td>T.C., central midfielder</td>
<td>90</td>
<td>6.4</td>
<td>203</td>
<td>4800 m</td>
<td>50''</td>
<td>83 m</td>
<td>51 m</td>
<td>0 m</td>
<td>43 min.</td>
</tr>
<tr>
<td>10</td>
<td>D.S., left defender</td>
<td>88</td>
<td>5.3</td>
<td>205</td>
<td>7000 m</td>
<td>70''</td>
<td>105 m</td>
<td>97 m</td>
<td>0 m</td>
<td>59 min.</td>
</tr>
<tr>
<td>11</td>
<td>V.M., central midfielder</td>
<td>60</td>
<td>5.3</td>
<td>207</td>
<td>4300 m</td>
<td>35''</td>
<td>128 m</td>
<td>96 m</td>
<td>0 m</td>
<td>30’ 40''</td>
</tr>
<tr>
<td>12</td>
<td>G.S., right midfielder</td>
<td>60</td>
<td>6.3</td>
<td>203</td>
<td>3700 m</td>
<td>30''</td>
<td>97 m</td>
<td>94 m</td>
<td>0 m</td>
<td>28 min.</td>
</tr>
<tr>
<td>13</td>
<td>C.I., central defender</td>
<td>84</td>
<td>6.1</td>
<td>190</td>
<td>4100 m</td>
<td>35''</td>
<td>122 m</td>
<td>41 m</td>
<td>0 m</td>
<td>26 min.</td>
</tr>
<tr>
<td>14</td>
<td>M.C., left midfielder</td>
<td>74</td>
<td>5.1</td>
<td>192</td>
<td>5020 m</td>
<td>30''</td>
<td>77 m</td>
<td>39 m</td>
<td>0 m</td>
<td>28’ 20''</td>
</tr>
<tr>
<td>15</td>
<td>A.C., central midfielder</td>
<td>60</td>
<td>6</td>
<td>203</td>
<td>4250 m</td>
<td>35''</td>
<td>134 m</td>
<td>98 m</td>
<td>0 m</td>
<td>34’ 50''</td>
</tr>
</tbody>
</table>
Conclusions

Using GP Sports in the assessment and testing of sportsmen provides the following information:

- Metabolic cost.
- Zoning of effort.
- Controlling effort’s dynamics.
- Distances run, etc.

All this information leads to an objective assessment of the sportsmen’s effort capacity.

REFERENCES