PILOT WORK ON TRAINING FOR QUANTITATIVE ASPECTS OF PERFORMANCE
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Abstract
Football is a sport which a high physical and physiological capacity is required to withstand the stress induced between matches and training sessions. This study focus on the periodization method specifically to strength features. Strength training is an important determinant of football performance, as key feature of physical capacity and main regulators of important football-specific tasks and Monitoring training load is an important feature for the control of the training process preventing injuries in football and consequently enhancing performance in sport. Two males amateur football performed basic strength and endurance test in order to assess changes during a pre-season and evaluate the efficacy of the periodization strength method applied in football. The purpose of this pilot study is to assess the effectiveness of periodized training monitoring changes in strength values in three different evaluation stages among a pre-season. This pilot study lays the groundwork for further research future in order to obtain additional data performing more reliable test with a greater sample.

Key words: strength, periodization, assessment, performance

Introduction
There are several definition of football in the literature, thus we chose the one that best fit to the purpose of the study. Football is a sport which a high physical and physiological capacity is required to withstand the stress induced between matches and training sessions (Bangsbo et al., 2007; Drust et al., 2007; Mohr et al., 2005; Reilly et al., 2008; Stølen et al., 2005). The aerobic and anaerobic lactacid recruitment mechanism of energy are required. The aerobic mechanism, is often found in coexistence with lactate or lactacid anaerobic mechanism. Rarely we can find the anaerobic lactacid mechanism and lactacid together (Reilly & Gilbourne, 2003). In a such manner as this can happen, a sport should make such breaks, as to allow the player to recover at least 90% of energy through the Krebs cycle (Bompa, 1999). This study focus on the periodization method (Bompa, 1999), it is the division of training season in specific periods in order to clearly defined goals In order to obtain "the best" results, athletes should follow a periodized program, undergo different programs based on their own needs, and according to the specific training phase. This planning is specific for each training phase, and it is in accordance with the agonistic program that the team will have to support. It have to consider also the qualitative aspects in order to enhance the performance in youth and amateur performer (Gaetano et al., 2015ab). Periodization it is useful to define each training phase in order to develop and reach the highest level of strength, power and muscular endurance without neglecting the skills and coordinative abilities. The periodization concept is based on the "principle of progressivity of load and physiological adaptation" and sets a goal in each stage, to take the players at the top shape at the time of most important games. Strength training is an important determinant of football performance, as key feature of physical capacity and main regulators of important football-specific tasks (Hoff & Helgerud, 2004). Traditional modalities to improve strength and conditioning features, include resistance training and plyometric exercises with movement patterns as close as possible to specific football skills, aiming to warrant the highest degree of transference between strength gains and football technical skills (Brito et al., 2014). A poor strength and conditioning capacity has been associated to an increased risk of injury (Brito et al., 2010; Mendiguchia et al., 2013; van Beijsterveldt et al., 2013). Monitoring training load is an important feature for the control of the training process (Rebelo et al., 2012) preventing injuries in football and consequently enhancing performance in sport. An precise assessment of training load is paramount for the planning and periodization of training, especially in the prevention of undertraining or overtraining and ensuring that athletes are in an optimal condition for competition (Little & Williams, 2007). The purpose of this pilot study is to assess the effectiveness of periodized training monitoring changes in strength values in three different evaluation stages among a pre-season.

Methods
The pilot work is the method to utilize for this study. Data collection was realized between August and October 2012 in University of Porto during Erasmus project and analyzed at University of Parthenope of Naples. According to previous literature, we identified some basic skills in football in three different specific periods, which are part the preparatory phase. Ten males amateur football players 21 years old from University Football selection. Participants were split in two groups, 5 subjects (periodized training) and 5 control group (no strength and endurance exercises).
According to Bompa (1999) we defined three different stages of pre-season: preparatory period as baseline, end of cargo (increasing of any strength load parameters) and end of transformatory period (transference of football specific strength exercises to technical skills). The periodization program consist in one session conditioning training per week where players performed strength and conditioning exercises (without ball) assisted by a physical coach, while control group performed regular soccer training (small sided conditioned games for the whole session). Tests of Maximum strength (1RM), Aerobic endurance (Cooper Test), and Body mass index (BMI) detection were performed. Strength capacity was assessed performing 1RM full squat with a bar and the subject were progressively asked to increase resistance. Aerobic endurance capacity was assessed with Cooper’s Test, which the subjects were required to cover 4000 m on an athletic track at maximum speed as possible.

**Results**

Below, progression of the two athletes are represented in a line chart, within the three different stages of pre-season. Despite slightly, it seems that periodization group presented greater improvement in all the test compared to control group.

<table>
<thead>
<tr>
<th>Table 1. Participants description as mean (N=10)</th>
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<tbody>
<tr>
<td>Evaluation period</td>
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<tr>
<td>Weight (kg)</td>
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<tr>
<td>Weight average ref. (kg)</td>
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<tr>
<td>% Normal body fat mass</td>
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<tr>
<td>% Ideal body fat mass</td>
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<tr>
<td>Resting heart rate (bpm)</td>
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<td>Maximum heart rate (bpm)</td>
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<th>Table 2. BMI (N=10)</th>
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<tr>
<td>Evaluation period</td>
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<tr>
<td>Value (kg/m²)</td>
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<td>Result Normal/Ideal</td>
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**Discussion**

Our hypothesis was an increasing of each strength and endurance parameters. Despite slightly, it seems that periodization group presented greater improvement in all the test compared to control group. These results increased the credence of the Tudor Bompa’s proposal about the concept of periodization of strength (Gaetano, Rago 2014, Raiola, Tafuri 2015, Raiola 2015abcd, Raiola et al. 2015ab). We think exercises performed without ball allow to an higher internal load compared to small sided games.
Those type of training may allow to build a “basic” strength ability allowing to maintain a certain strength levels during the whole season. This concept allows us to achieve peak performance in the desired period. We applied this concept both in amateur football players and professional one. This pilot study lays the groundwork for further research future in order to obtain additional data performing more reliable test with a greater sample. In this way, it could be possible to plan the same work for disabled athletes and for special needs activities (Altavilla et al 2015ab).

References
PILOT STUDIJA TRENINGA ZA KVANTITATIVNE ASPEKTE UČINKA IZVEDBE

Sažetak
Nogomet je sport u kojemu je potreban visoki fizički i fiziološki kapacitet da se izdrži stres inducirani između utakmica i treninga. Ova studija usredotočena je na metode periodizacije i to posebno na značajke snage. Trening snage je važna odrednica nogometne izvedbe, kao što je ključno obilježje fizičke sposobnosti i glavnih regulatora važnih nogometnih specifičnih zadataka i praćenja obuke. Opterećenje je važna značajka za kontrolu trenažnog procesa i sprječava ozljede u nogometu, a time osigurava i povećanje performansi u sportu. Dva ispitanika muškog spola iz amaterskog nogometa u domeni temeljne snage i izdržljivosti testirani su u cilju procjene promjena tijekom predsezone i ocjene učinkovitost metode snage u periodizaciji primjenjenoj u nogometu. Svrha ovog pilot istraživanja je procijeniti učinkovitost periodizacije i praćenja promjena treninga u vrijednosti snage u tri različite faze evaluacije u predsezoni. Ova pilot studija ima namjeru položiti temelje za daljnja istraživanja u budućnosti kako bi se dobili dodatni podatci uz uporabu pouzdanijih testova I uz veći uzorak.

Ključne riječi: snaga, periodizacija, procjena, izvedba

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