

Original article (short paper)

Analysis and comparison of intensity in specific soccer training sessions

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Abstract—This study compared the exercise intensity of four specific soccer training sessions (friendly and training match, tactical and technical workouts). Ten professional soccer players (24.2 ± 3.7 years, 177.9 ± 7.3 cm, 63.2 ± 4.6 mL $O_2 \cdot kg^{-1} \cdot min^{-1}$) were recruited. A treadmill progressive interval test was performed to determine the players' VO_{2max} , maximal heart rate (HR_{max}), HR- VO_2 curve, and the heart rate corresponding to blood lactate concentrations of 2 and 4 mmol/L. The heart rate during the training sessions was used to estimate the exercise intensity and to classify them into intensity zones (low-intensity: <2 mmol/L; moderate-intensity: between 2 and 4 mmol/L; high-intensity: >4 mmol/L). Exercise intensities were different among training sessions (friendly match: $86.0 \pm 5.1\%$ HR_{max} ; training match: $81.2 \pm 4.1\%$ HR_{max} ; tactical workout: $70.4 \pm 5.3\%$ HR_{max} ; technical workout: $62.1 \pm 3.6\%$ HR_{max}). The friendly match presented the highest percentage of time performed in the high-intensity zone.

Keywords: exercise intensity, heart rate, soccer

Resumo—“Análise e comparação da intensidade em sessões específicas de treinamento de futebol.” Este estudo comparou a intensidade de quatro treinamentos específicos de futebol (jogo treino, amistoso, treinos técnicos e táticos). Dez jogadores de futebol profissional foram recrutados ($24,2 \pm 3,7$ anos, $177,9 \pm 7,3$ cm, $63,2 \pm 4,6$ mL $O_2 \cdot kg^{-1} \cdot min^{-1}$). Um teste progressivo intervalado em esteira foi realizado para determinar o VO_{2max} , frequência cardíaca máxima (FC_{max}), curva FC- VO_2 , e frequência cardíaca correspondente às concentrações de lactato de 2 e 4 mmol/L. A frequência cardíaca dos treinos foi usada para estimar a intensidade do exercício e classificá-los em zonas de intensidade (baixa, <2 mmol/L; moderada: entre 2 e 4 mmol/L; alta: >4 mmol/L). As intensidades das sessões de treinamento foram diferentes (jogo amistoso: $86,0 \pm 5,1\%$ FC_{max} ; jogo treino: $81,2 \pm 4,1\%$ FC_{max} ; treino tático: $70,4 \pm 5,3\%$ FC_{max} ; treino técnico: $62,1 \pm 3,6\%$ FC_{max}). O jogo amistoso apresentou porcentagem mais alta de tempo realizado na zona de intensidade alta.

Palavras-chave: frequência cardíaca, futebol, intensidade de exercício

Resumen—“Análisis y comparación de la intensidad de las sesiones de entrenamiento de fútbol específicas.” Este estudio comparó la intensidad de cuatro entrenamientos específicos de fútbol (juego de entrenamiento, amistoso, técnico y táctico). Diez jugadores de fútbol profesional fueron reclutados ($24,2 \pm 3,7$ años, $177,9 \pm 7,3$ cm, $63,2 \pm 4,6$ mL $O_2 \cdot kg^{-1} \cdot min^{-1}$). Un examen con intervalos progresivos en la caminadora fue realizado para determinar: VO_{2max} , FC_{max} , curva FC- VO_2 y frecuencia cardíaca correspondiente a las concentraciones de lactato de 2 y 4 mmol/L. La frecuencia cardíaca de los entrenamientos fue usada para estimar la intensidad del ejercicio y clasificar zonas de intensidad (baja <2 mmol/L; moderada

>2 y <4 mmol/L; alta >4 mmol/L). Las intensidades de las sesiones de entrenamiento fueron diferentes (juego amistoso: $86,0 \pm 5,1\%$ FC_{max}; entrenamiento $81,2 \pm 4,1\%$ FC_{max}; entrenamiento táctico $70,4 \pm 5,3\%$ FC_{max}; entrenamiento técnico $62,1 \pm 3,6\%$ FC_{max}). El juego amistoso presentó porcentaje más alto de tiempo realizado en la zona de intensidad alta.

Palabras claves: frecuencia cardíaca, fútbol, intensidad de ejercicio

Introduction

Soccer performance is dependent of both technical and tactical skills and physical capacities. Since soccer players may be required to play up to ~50 games over a season, the time available for training becomes limited, what suggests that technical and tactical training should be performed under conditions that replicate the physical demands of a competitive game (Köklü, 2012; Owen, Wong Del, Paul, & Dellal, 2012). Several recent studies have been shown that both the technical and tactical and physical capacities could be trained simultaneously during varied soccer training drills, such as small-sided games (Köklü, 2012; Köklü, Albayrak, Keysan, Alemdaroğlu, & Dellal, 2013; Owen *et al.*, 2012), circuit ball training (Hoff, Wisloff, Engen, Kemi, & Helgerud, 2002) and even friendly matches (Fernandes, 2002). However, just few studies evaluated the exercise intensity of specific tactical and technical training, what would be important since they are commonly used by coaches (Campos *et al.*, 2013).

The intensity of soccer match has been reported to be around 70–80% of the maximal oxygen uptake (VO_{2max}) (Castagna, Impellizzeri, Chaouachi, Bordon, & Manzi, 2011), around 165 bpm of heart rate (HR) values or 85% of the maximum heart rate (HR_{max}) (Helgerud, Engen, Wisloff, & Hoff, 2001; Krstrup *et al.*, 2006). HR is a valid measure of the intensity during aerobic activities due to its linear relationship with VO_2 even during intermittent activities like soccer (Bangsbo, 1994). In addition, monitoring HR is considered the easiest and most recommended tool to assess official soccer match intensities (Campos *et al.*, 2013; Dellal *et al.*, 2012). Furthermore, since the soccer game requires sprint performance, and it has been demonstrated a significant correlation between the anaerobic threshold and repeated sprint ability (Silva, Guglielmo, Dittrich, Floriano, & Arins, 2011), measurement of exercise intensity based on the Lactate Threshold (LT) should be implemented (Eniseler, 2005; Campos *et al.* 2013).

Most studies have examined the intensity of small-sided games (Dellal *et al.*, 2012) showing exercise intensities varying from 70 to 91% HR_{max} (Hill-Haas, Dawson, Impellizzeri, & Coutts, 2011). However, few investigations have described the exercise intensity of other soccer-specific training modalities (Eniseler, 2005). Eniseler (2005) estimated the exercise intensity by using heart rate values and time expended above LT of small-sided games (135bpm; 23.9%), soccer matches (157bpm; 49.6%) tactical (118bpm; 4.5%) and technical training (126bpm; 0%) (Eniseler, 2005). The author categorized the small-sided game as “moderate-intensity,” although it has been classified as high intensity in other studies (Dellal *et al.*, 2012; Köklü, 2012; Köklü *et al.*, 2013; Owen *et al.*, 2012; Rampinini *et al.*, 2007). Nevertheless, to the best of our knowledge, we found no studies that examined the intensity of tactical and technical training in real training situations (without researcher’s interference). In addition, Eniseler (2005) expressed the exercise intensity by absolute HR

values, which hampers inter-subject comparison of players due to the difference in HR_{max} values among players (Dellal *et al.* 2012).

Therefore, information regarding the intensity of specific exercise modalities commonly used in soccer training is needed for better planning of the load training. The purpose of the present study was to examine and compare exercise intensities of training match, friendly match, tactical training and technical training of a Brazilian first-division professional soccer team. We hypothesized that the intensity and the time expend above the lactate threshold of the trainings with opponents, friendly and training match, are higher than the observed during the trainings without opponents, tactical and technical workouts.

Methods

Participants

Ten male, elite soccer players (age = 24.2 ± 3.7 years, body mass = 73.9 ± 7.9 kg, height = 177.9 ± 7.3 cm, body fat = $9.5 \pm 2.1\%$, $VO_{2max} = 63.2 \pm 4.6$ mL·kg⁻¹·min⁻¹) volunteered to participate in this study. Participants were all elite professional soccer players from one of the first-division top Brazilian teams, and were familiar with the physical demands of the training drills used in this study. This study was approved by the ethics committee of the Federal University of Minas Gerais in 27/06/2007 (ETIC-206/07) and all participants gave verbal and written consent to engage in all testing procedures.

The players’ positions were: 2 side defenders, 2 center backs, 2 defensive midfielders, 2 attacking midfielders, and 2 strikers. The study design originally included 3 athletes for each position, but due to injuries, complementary examinations, or transfers to other teams, 4 athletes did not participate and were excluded from the sample. Furthermore, to make the number of athletes for each position even, one additional athlete was excluded. The inclusion criterion was perfect attendance to all training activities evaluated in the present study. Players who did not participate in one of the training sessions for any reason were excluded from the study. The environmental conditions during the training sessions were as follows: in the friendly match, dry-bulb temperature (Dbt) $26.8 \pm 0.2^\circ\text{C}$, wet-bulb temperature (Wbt) $21.1 \pm 0.1^\circ\text{C}$, relative humidity (RH) $77.1 \pm 4.6\%$; training match, Dbt $23.9 \pm 2.2^\circ\text{C}$, Wbt $21.0 \pm 0.2^\circ\text{C}$, RH $79.0 \pm 12.2\%$; tactical training, Dbt $25.2 \pm 0.3^\circ\text{C}$, Wbt $21.3 \pm 0.5^\circ\text{C}$, RH $77 \pm 5.3\%$; and technical training, Dbt $23.6 \pm 1.9^\circ\text{C}$, Wbt $20.0 \pm 0.5^\circ\text{C}$, RH $75.3 \pm 13.6\%$.

Assessment of the maximal oxygen uptake

A progressive treadmill interval running test (PTI) was performed to determine the players’ maximal oxygen uptake

(VO_{2max}), HR_{max} , the HR- VO_2 curve, and the corresponding heart rate to blood lactate concentrations of 2 and 4 mmol/L.

The protocol test resembled the one adopted by Rodrigues *et al.* (2011) which consisted of stages lasting 5 min each on the treadmill (Quinton – Q4500, USA) at speeds of 6, 9, 12, and 15 $km \cdot h^{-1}$, respectively, and a 2% slope. There were two-minute intervals between the first, second, and third stages (6, 9, and 12 $km \cdot h^{-1}$) and a 5-min interval between the third and fourth stages (12 and 15 $km \cdot h^{-1}$). Once the treadmill speed reached 15 $km \cdot h^{-1}$, the slope was increased by 2% every 2 min of exercise until the onset of fatigue. Blood samples were collected from the fingertip into capillaries during the intervals between the stages and at end of test. During the entire test, oxygen uptake and carbon dioxide production were evaluated every minute by a gas analyzer (MP-35, BIOPAC® Systems, Goleta, CA), calibrated before each test according the manufacturer's recommendations and the HR was measured using a telemetry system every 30 seconds (Polar® Team System®, Oulu, Finland). The average data from the last minute of each stage was used to determine individual HR and VO_2 values. In order for the VO_2 measured to be considered the VO_{2max} , the volunteers were required to reach at least 3 of the following criteria: (1) a VO_2 plateau, despite an increase in intensity; (2) breathing exchange (R) > 1.1; (3) clear evidence of fatigue; (4) HR values ranging up to 10 bpm from the HR_{max} figured from the age (220 - age); (5) peak of lactate concentration >9 mmol/L (Dupont, Akakpo, & Berthoin, 2004).

The individual HR- VO_2 linearity curve was tested (Pearson's product-moment correlation) and a regression equation was developed to estimate VO_2 from the HR values measured during the training sessions (Esposito *et al.*, 2004). The individual HR_{max} was determined as the highest HR found during the PTI test, and was used to calculate the $\%HR_{max}$.

Exercise intensity zones

Blood samples (25 μL) were collected immediately before the PTI test, during the intervals, and at the end of the test and stored in Eppendorf® (Westbury, NY, USA) tubes containing 50 μL NaF (1%) for later analysis (YSL 2300 STAT®, Yellow Springs, OH, USA). The HR values corresponding to the 2 mmol/L ($HR_{2mmol/L}$) and 4 mmol/L ($HR_{4mmol/L}$) blood lactate concentrations were estimated by linear interpolation. The $HR_{2mmol/L}$ and $HR_{4mmol/L}$ values were used to determine 3 intensity zones: low (below the $HR_{2mmol/L}$ value), moderate (between the $HR_{2mmol/L}$ and $HR_{4mmol/L}$ values), and high (above the $HR_{4mmol/L}$ threshold).

Training intensity

The Polar® Team System® was used to measure the HR of the athletes during the four training sessions (training match, friendly match, technical workouts, and tactical workouts) performed during the first 2 weeks of the pre-season. The average HR registered during the training sessions was used to calculate the exercise intensity as $\%HR_{max}$ and $\%VO_{2max}$. The times spent within the 3 intensity zones (low-, moderate-, and high-intensity

zones) were also calculated. All players' HRs were monitored during all training sessions, and the average registered HR value was used for data analysis.

The time between the physical tests and the beginning of training sessions was 48 to 72 h, whereas the time between 2 training sessions was at least 48 h and no more than 2 weeks.

Friendly match

Friendly match was used as a training session; therefore this training method was analyzed in the current study. The match was played on an official pitch (90 × 74m) between two different opposing soccer clubs (11 players each). The match duration was 91 min, divided into the 1st (45 min) and 2nd (46 min) halves with 15 min of rest between them. Each athlete participated in only one half of the match. The team played in a 4-4-2 formation.

Training match

Training match was played on an official pitch (90 × 74m) between 2 opposing teams consisting of 11 players each from the same soccer club. All corners and free kicks near the penalty area were executed 3 times, even if the players had already scored. Training match duration was 50 min, divided into the 1st (30 min) and 2nd (20 min) halves with 5 min of rest between them.

Tactical training

In this modality, 5 players were required to execute a "wing-attack combination for goal scoring," which would culminate in a forward shot (Figure 1). This activity was performed using half of the pitch,

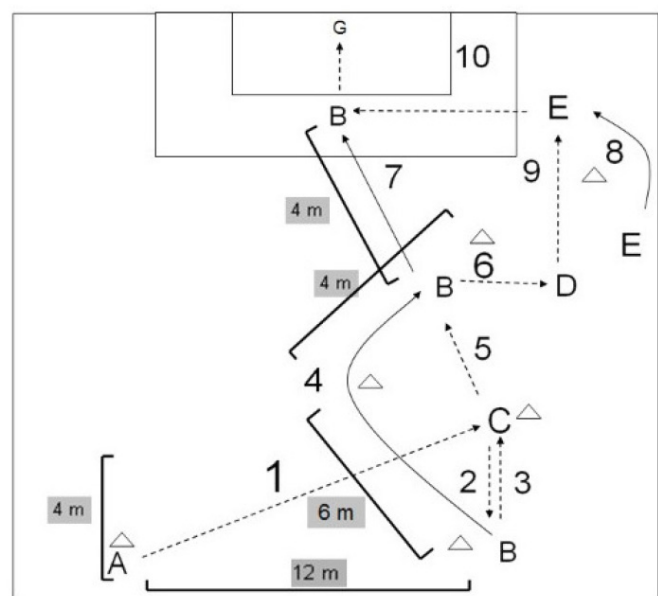


Figure 1. Tactical training illustration. Soccer players (A, B, C, D, and E). The order of events for the different soccer players (1, 2, 3, 4, and 5), and goalkeeper (G). Soccer players moving without the ball →. Ball trajectory:

without any competitors, and lasted 16 min without any rest. Every player performed each of the different functions in this modality. Because there were 2 players for the same position, they took turns playing. Therefore, the rest time between 2 stimuli was the time needed to assume the position to restart the activity (about 2 min).

Technical training

Technical training consisted of the execution of one or more technical principles (passing, kicks, ball control, reception, headings), not necessarily in that sequence, always without the presence of opponents. This training lasted 14 min.

Statistical analysis

The normality of data was verified using the Ryan-Joiner test, performed using the Minitab® 15.1.0.0 Software. A one-way repeated measures ANOVA was used to examine the effect of the specific training modality (“exercise type” factor) on exercise intensity expressed as HR, %HR_{max} and %VO_{2max}. For comparisons between training modalities and zones, a two-way repeated measures ANOVA was used. When a significant *F* value was found, Duncan’s *post-hoc* test was used. All the analyses, with the exception for normality test, were performed using SigmaStat® 3.5 software. The level of significance was set at $p < .05$. Since the present study was designed using repeated measurements, 10 volunteers were enough to ensure a statistical power of .90, with $p = .05$ being considered significant.

Results

The average measured HR2mmol/L intensity values were 69.5 ± 9.9 %HR_{max} (range 58.3 to 83.8), 48.7 ± 16.6 %VO_{2max}

(range 23.6 to 70.6) and 8.2 ± 1.8 km·h⁻¹ (range 6.0 to 10.6). The average measured HR4mmol/L intensity values were 86.3 ± 3.5 %HR_{max} (range 81.9 to 91.9), 75.5 ± 6.9 %VO_{2max} (range 64.5 to 86.2), and 11.4 ± 1.4 km·h⁻¹ (range 9.0 to 13.3).

A significant effect of the specific training modality was found in most of the dependent variables (absolute HR, %HR_{max} and %VO_{2max}), indicating that the exercise intensity was different between the 4 training protocols (Table 1). Furthermore, players remained longer in the high-intensity zone during friendly match when compared to training match, and during the training match when compared to tactical training and technical training (Table 2). Players spent more time in the low-intensity zone during technical training than in all other training sessions ($p < .05$).

Discussion

The aim of this study was to examine and compare exercise intensities of training match, friendly match, tactical training and technical training of a Brazilian first division professional soccer team. The main finding was the observation of a higher intensity of effort in friendly match compared to the training match. Another important outcome of the present study was calculating the intensity using %HRmax and time expend in different lactate threshold zones (Eniseler, 2005) of four training drills widely used in football, such as friendly match, training match, tactical and technical workout. In addition, we are unaware of other study which analyzed the exercise intensity during regular training drills of one of the top Brazilian soccer teams, what assures player’s motivation and diminishes any research’s bias.

When the time expended in each of the intensity zones was compared, it was observed that the friendly match was the most intense, followed by the training match, tactical training, and technical training sessions (Table 2; $p < .05$). The friendly match was more intense than the training mat-

Table 1. Intensities of friendly match, training match, tactical training, and technical training, expressed as absolute heart rate (HR bpm), maximal heart rate percentage (%HR_{max}) and maximal oxygen uptake percentage (%VO_{2max}).

Intensity expression	Friendly match	Training match	Tactical	Technical
HR bpm	171.0 ± 12.3	161.0 ± 8.5*	140.0 ± 13.2* ^ε	124.0 ± 8.4* ^ε ‡
%HR _{max}	86.0 ± 5.1	81.2 ± 4.1*	70.4 ± 5.3* ^ε	62.1 ± 3.6* ^ε ‡
%VO _{2max}	75.2 ± 7.5	67.8 ± 7.0*	50.4 ± 9.9* ^ε	37.9 ± 7.8* ^ε ‡

*Difference in comparison to the friendly match, ^ε Difference in comparison to the training match, [‡] Difference in comparison to tactical training ($p < .05$)

Table 2. Exercise intensity among training match, friendly match, tactical training, and technical training, expressed as the percentage of time during which HR remained below the level corresponding to a 2 mmol/L lactate concentration (low-intensity zone), between the 2 and 4 mmol/L levels (moderate-intensity zone), and above the 4 mmol/L level (high-intensity zone).

Intensity zone	Friendly match	Training match	Tactical	Technical
Low-intensity zone (%time)	5.8 ± 11.8 [#] ‡	14.4 ± 16.4 [§]	42.6 ± 41.2 ^{*ε} ‡	69.0 ± 28.4 ^{*ε} ‡ [#]
Moderate-intensity zone (%time)	36.1 ± 19.5	57.6 ± 19.5 [#] *	53.3 ± 38.2 [#]	31.0 ± 28.4 ^ε ‡ [#]
High-intensity (%time)	58.1 ± 22.8	28.0 ± 14.5 [*]	4.1 ± 8.3 ^{*ε}	^{*ε}

*Difference in comparison to the friendly match, ^ε Difference in comparison to the training match, [‡] Difference in comparison to tactical training; comparisons were made between the same zones. [#] Difference in comparison to the high-intensity zone, [§] difference in comparison to the moderate-intensity zone; comparisons were made within the same ($p < .05$)

ch probably due to the increased motivation of the players, once the opposing team was from another soccer club (Hoff *et al.*, 2002; Rampinini *et al.*, 2007). It is also likely that the inherent characteristics of the training match, in which all the corners and free-kicks near the penalty area were executed 3 times, may have allowed a recuperation period that resulted in reduced average intensity.

Friendly games are used to improve the technical and tactical skills, to complement the physical training or even for long non-competitive periods during the season. Knowing

the intensity of this type of physical training is extremely important, particularly because it was found to be more intense than a training match. Therefore, these results may enable better choices and control of the training load. We also found that the friendly game in the present study had an intensity equal to 86% of the HR_{max} , which is approximately the same as that found during official soccer games, both in the adult (84% of the HR_{max}) (Coelho *et al.*, 2008) and under-17 and under-20 categories (84.4 and 84.1% of the HR_{max} , respectively) (Coelho *et al.*, 2011).

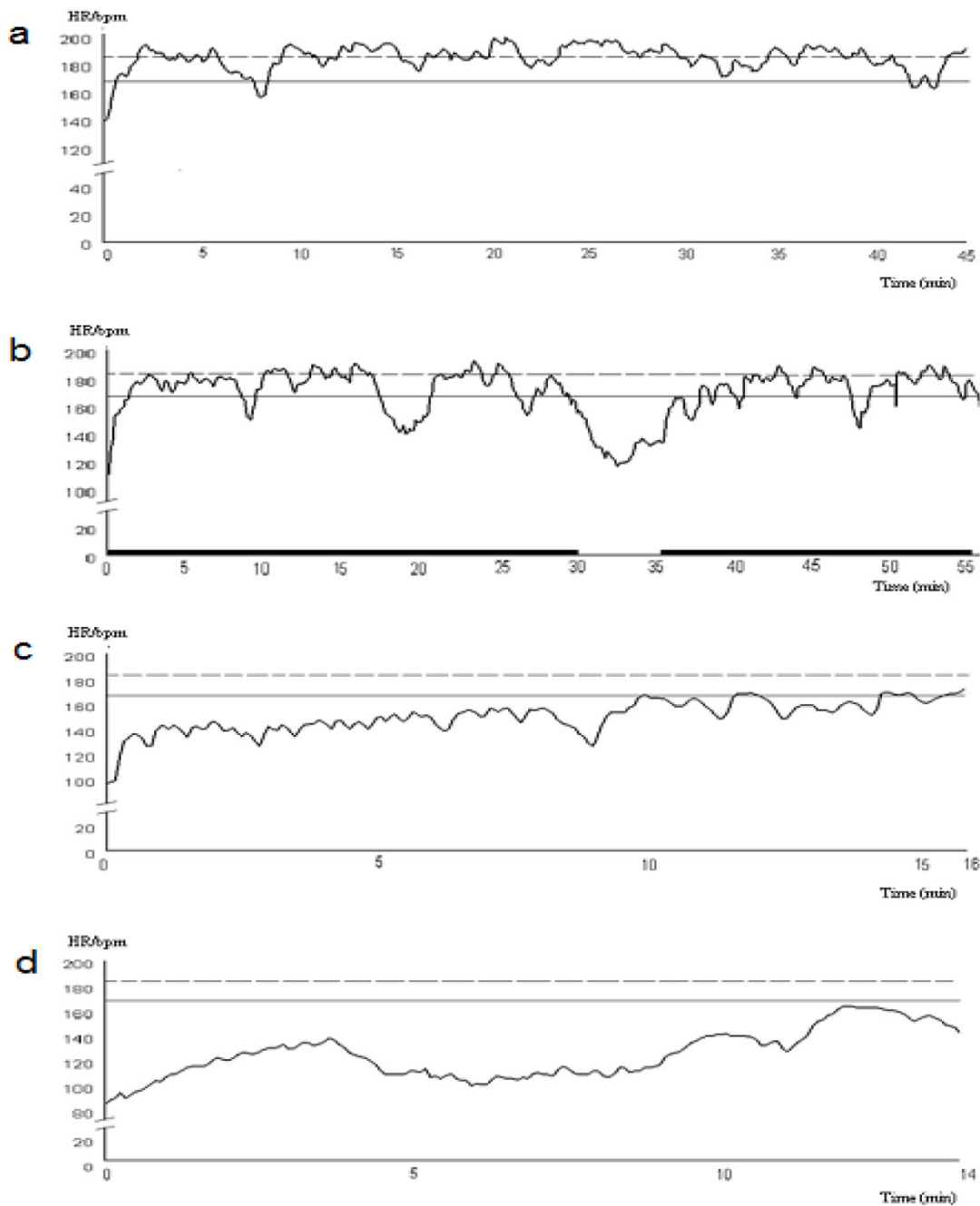


Figure 2. HR (bpm) response of a single player during several different training sessions (a. friendly match; b. training match; c. tactical workout; d. technical workout). The two lines (dotted and continuous traces) refer to the HR corresponding to the blood lactate concentrations of 4 mmol/L and 2 mmol/L, respectively. During the training match, bold line next to the time line represents the stimulus period.

In this study, intensity zones were used to allow for a more precise physiologic characterization of the activity and these three intensity zones have already been used by other authors in soccer (Eniseler, 2005; Impellizzeri, Rampinini, & Marcora, 2005; Mcmillan *et al.*, 2005). Further, intensity zones were compared among the different training activities, in contrast to the study by Eniseler (2005), who did not make such a comparison. While a soccer match can be categorized as a high intensity activity, heart rate values for tactical and technical training activities were in the low-intensity category (Eniseler, 2005). In fact, most studies express exercise intensity during activity as an overall average, which can result in a substantial loss of specific and relevant information (Helgerud *et al.* 2001).

The friendly match intensity in the current study (171 ± 12.3 bpm; $86 \pm 5.1\%$ HR_{max} and $58.1 \pm 22.8\%$ of the total time in the high-intensity zone) was higher when compared to that of the friendly match described by Eniseler (2005) (157 ± 19 bpm; $49.6 \pm 27.1\%$ of the total time in the high-intensity zone), Rodrigues *et al.* (2007) ($75.1 \pm 1.8\%$ of the HR_{max}) and Fontes *et al.* (2007) ($79.6 \pm 3.2\%$ of the HR_{max}). Although Eniseler (2005) did not report the size of the field where the activity was performed and athletes' VO_{2max}, Tessitore, Meeusen, Piacentini, Demarie, and Capranica (2006) showed that the exercise intensity is higher when the soccer training is played in a smaller field (30×40 m) than in a bigger one (40×50 m). Furthermore, Helgerud *et al.* (2001) have shown that an increase in VO_{2max} of their subjects from 58.1 ± 4.5 mL·kg⁻¹·min⁻¹ to 64.3 ± 3.9 mL·kg⁻¹·min⁻¹ after a training period resulted in players increasing their average effort intensity during the game, remaining longer in the high-intensity zones and to increase in 100% the number of sprints. The VO_{2max} of the analyzed players in the current study (63.2 ± 4.6 mL·kg⁻¹·min⁻¹) was higher than other studies (Arnason *et al.* 2004; Baroni, Couto, & Leal Junior, 2011) what could have led to a higher intensity of our friendly match.

The technical training was performed at the beginning of the training session, as a "warm-up" activity, in the absence of opponents. These two factors, along with the small distance between the players (short moves), the low speed of such moves, and the interruptions made by the coach in order to change exercise, have led this type of training to be a low-intensity activity. The exercise intensity values of technical training sessions recorded in the present study (124 ± 8.4 bpm; $62.1 \pm 3.6\%$ of the HR_{max} and $31.0 \pm 28.4\%$ of total time in the moderate-intensity zone) were similar than the values presented by Eniseler (2005) (118 ± 21 bpm; $22.7 \pm 13.8\%$ of total time in the moderate-intensity zone). It is likely that technical training in both studies were similar, consisting of the execution of principles such as passing, ball control, all performed without opponents. In the other hand, tactical training sessions analyzed in this study (140 ± 13.2 bpm; $53.3 \pm 38.2\%$ of total time in the intermediate zone) were more intense than in Eniseler (2005) (126 ± 21 bpm; $70.4 \pm 5.3\%$ of the HR_{max} and $32.1 \pm 16.8\%$ of total time in the intermediate zone). This difference could be explained by encouragement of the coach in present study, since the analyzes were made during regular training drills, though in the current study, tactical training sessions consisted of a "rehearsed move," performed in half of the pitch, without opponents, similar to the one described in Eniseler (2005).

The results found in the present study should be considered with limitations. The difference in environmental conditions may have had some effect on the measured training intensity. However, because this is a field research, where we tried to interfere minimally with the training sessions, this kind of limitation was expected, and the environmental conditions were registered to allow an analysis that includes this factor in case of considerable differences. Another limitation of the present study is the different durations of the compared training drills, what was also expected since we they are of distinct characteristics and objectives. Friendly games and training matches are more specific and therefore of longer duration than technical and tactical training sessions, which are normally used as complementary training and preparatory activity, respectively.

The purpose of the present study was to monitor effort intensity from different specific soccer training methods commonly applied in soccer teams. Because no other study in literature has expressed the exercise intensity of soccer-specific training sessions in a variety of ways, it should be keep in mind that this interpretation can support other professionals involved in monitoring training load in sports. It can be concluded that the friendly game is the most intense activity, followed by training match, tactical training, and technical training. Considering the lack of time for training, the knowledge intensity of different activities commonly proposed by coaches and physical trainers allows better planning of training load. Thus, the friendly game and training match could be used for improve physical capacities during pre-season, for example. Unlike the technical and tactical training that can be used as a warm up activities and to allow a recovery of players without ceasing the training load.

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Acknowledgments

This study is part of the master's thesis of the first author. This investigation was supported by CNPq, FAPEMIG, PRPq, CAPES, FINEP, FUNDEP/SANTANDER and Brazilian Ministry of Sport.

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Manuscript submitted on February 27, 2013

Manuscript accepted on January 30, 2015



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