

Effects of playing three matches consecutive days in U16-U19 soccer players' vertical jump, rate of perceived exertion and wellness

Efectos de jugar tres partidos de fútbol consecutivos sobre el salto vertical, percepción subjetiva del esfuerzo y el wellness en jugadores de fútbol de categoría Sub 16 y Sub 19

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Abstract. Objective: The objective of this study was to analyze the effect of playing several friendly matches on consecutive days affects neuromuscular fatigue evaluated with countermovement jump (CMJ), session rate of perceived effort (sRPE) and wellness in young male soccer players. Participants: Forty-four young male soccer players from Under 16 (U16) (N= 23; age: 14.70 ± 0.48 years) and U19 (N= 19; age: 17.63 ± 0.52 years) participated in this study. Method: The evaluation of CMJ and Wellness was carried out pre-and post-match. sRPE was recorded 30 minutes after the end of each game. Effect sizes (ES) were calculated using Cohen's and statistical significance was set at $p < 0.05$. Results: [U16 group]: differences between CMJ values after the last match and first ($p < 0.001$) and second ($p < 0.001$) matches. Differences in fatigue, soreness and stress ($p < 0.05$) were observed. [U19 group]: Differences in CMJ were observed when baseline values were compared with post-match values ($p < 0.001$) and also when the last match were compared to the first ($p < 0.001$) and the second ($p < 0.001$) matches. We only noticed differences between the second and third matches were observed in sleep, stress and humor variables ($p < 0.05$). Conclusion: In this scenario of competitive tournaments in young players, it is important for fitness coaches to propose practical solutions for reducing the accumulation of fatigue, since this could influence the state of well-being and physical performance of players, and the possible increase on injuries.

Key words: Soccer, Muscle Fatigue, Questionarie, Evaluation, Intensity Workload.

Resumen. Objetivo: El objetivo de este estudio fue analizar el efecto jugar varios partidos amistosos de fútbol en días consecutivos sobre la fatiga neuromuscular evaluada con el salto con contramovimiento (CMJ), percepción subjetiva del esfuerzo (PSE) de la sesión y el bienestar en jugadores jóvenes de fútbol. Participantes: Cuarenta y cuatro jugadores jóvenes de fútbol masculinos de Sub 16 (S16) (N= 23; edad: 14,70 ± 0,48 años) y S19 (N= 19; edad: 17,63 ± 0,52 años) participaron en este estudio. Métodos: La evaluación del CMJ y Wellness se realizó pre y post partido. La PSE se registró 30 minutos después de cada partido. El tamaño del efecto (TE) se calculó utilizando d-Cohen y la significación estadística se fijó en $p < 0,05$. Resultados: [S16]: diferencias en CMJ entre el último y primer partido ($p < 0,001$) y segundo ($p < 0,001$). Se observaron diferencias en fatiga, dolor y estrés ($p < 0,05$). [S19]: se observaron diferencias en CMJ cuando se compararon los valores pre y post partido ($p < 0,001$) y también cuando se comparó el último partido con el primero ($p < 0,001$) y el segundo ($p < 0,001$). Solo se observaron diferencias con el segundo y tercer partido en las variables sueño, estrés y humor ($p < 0,05$). Conclusión: En este escenario funcionamiento de torneos formativos, es importante que los preparadores físicos, propongan soluciones prácticas que puedan reducir la acumulación de fatiga, ya que esta, podría influir en el estado de bienestar y rendimiento físico de los jugadores, y el posible incremento lesional.

Palabras clave: Fútbol, Fatiga Muscular, Cuestionario, Evaluación, Intensidad de la Carga de Trabajo.

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Introduction

Soccer is an intermittent team sport in which performance is influenced by actions performed at high intensity (Benítez-Jiménez et al., 2020; Morera-Carbonell, et al., 2023). From the kinematic point of view, a soccer match comprises between 1000-1400 activity changes every 3-5 seconds (Bangsbo et al., 2006; Iaia et al., 2009; Stølen et al., 2005), including actions with and without the ball, such as changes of direction, accelerations, decelerations, jumps and sprints (Otero-Esquina et al., 2017; Sáez de Villarreal et al., 2015). These highly demands generate alterations in the musculoskeletal, nervous, metabolic and immune systems, which produce fatigue in soccer players (Brownstein et al., 2017; De Hoyo et al., 2016; Thomas et al., 2017). This fatigue seems to reduce physical performance even several days after the competition (Ispirididis et al., 2008; Roe et al., 2017). In recent years, density in soccer has been increases, and players must to participate in two or three games in the same week, which significantly affect the

players' performance (Benítez-Jiménez et al., 2020; Broodryk et al., 2019; Fowler et al., 2015). Despite this, the studies about the analysis of the induced fatigue due to consecutive matches at young ages, where they usually play competitive tournaments, are scarce (Benítez-Jiménez et al., 2020). For these reasons, future studies on this topic are warranted (Haneishi et al., 2017).

In order to monitoring fatigue in soccer players, strength and conditioning coaches have used several neuromuscular tests, mainly focused on the lower limb (Falces-Prieto et al., 2020b), being the countermovement jump test (CMJ) one of the most used (Claudino et al., 2017; Falces-Prieto et al., 2021). Specifically, it has been observed a relevant neuromuscular fatigue during specific phases of the matches, mainly at the final phase of each period (Silva et al., 2015), producing a decrease in jump height immediately after the match (Marqués-Jiménez et al., 2017), at 24 hours (Roe et al., 2017), 48 hours (Watkins et al., 2017), 72 hours (Marqués-Jiménez et al., 2017; Roe et al., 2017; Silva et al., 2015) and even 96 hours after the game

(Thomas et al., 2017). However, some investigations have not found a correlation between exercise-induced neuromuscular fatigue and decreased CMJ height (Krustrup et al., 2010; Thorlund et al., 2009). Therefore, it could be interesting to analyze if the height reached in the CMJ can be able to detect the neuromuscular fatigue induced by playing several matches on consecutive days.

Regarding to monitoring load in soccer, it is essential to use different tools which allow knowing the load supported by players during matches and/or training (Falces-Prieto et al., 2020b; Murillo-Lorente et al., 2016). Prior studies have showed are different methods to know the intensity of training sessions and matches such as heart rate monitors (HR) (Falces-Prieto et al., 2015), lactate level (LL) (McMillan et al., 2005), global positioning systems (GPS) (Beenham, et al., 2017; Principe et al., 2021), rating of perceived exertion (RPE) (Falces-Prieto et al., 2015; Jiménez-Barreto & Borges, 2021; Sousa et al., 2021) and well-being questionnaires such as the Wellness (Campos-Vázquez et al., 2017). Among them, the rate of perceived exertion (RPE) is a key method to monitoring psychophysiological response with players in training sessions (sRPE), due to it is non-invasive method and free (Borg, 1970). It is used to evaluate the effort that a person perceives when performing a physical exercise, and integrates information from different organic systems, both physical and psychological (Falces-Prieto et al., 2020a) being widely used in soccer populations (Falces-Prieto et al., 2015). Regarding wellness questionnaires, sports scientists have recommended the use of these questionnaires to monitor the status and well-being of athletes (Saifeddin-Fessim & Moalla, 2018), for showing to be sensitive to oscillations in the training load in soccer players (Buchheit et al., 2013; Campos-Vázquez et al., 2017). Therefore, these questionnaires also allow to assess the psychological intensity in a simple and cost-effective way. Hence, it could be a useful tool for coaches of players in formation (González-Fernández et al., 2022).

To solve the gaps observed in literature, an investigation was designed to know how affect playing various friendly matches in consecutive days to neuromuscular fatigue, RPE and wellness in young football players. Specifically, the aim of study was three-fold: (1) to determinate change assessment in height performance in CMJ post-friendly matches played in consecutive days, (2) to evaluate if exist significative correlation between shown in CMJ, minutes of playing performed and sRPE response, (3) and influence in Wellness after high match congestion. Our first hypothesis was lower height in CMJ performance after successions matches. Our second hypothesis was these changes would be correlated with the minutes of playing performed and RPE response post-matches. Third hypothesis would show a negative response in Wellness markers. The results expected could be interesting because will provide a guide about damage neuromuscular and wellness, as a result of play matches in consecutive days, supporting to reduce injury risk for excess of load or fatigue and/or adjust congestion calendar.

Material and Methods

Participants

Forty-four young male soccer players from U16 age-category (N= 23; age: 14.70 ± 0.48 years) and U19 age-category (N= 19; age: 17.63 ± 0.52 years) participated in this study. The competitive level was category division of honor for the U16 and thpe National Youth League for the U19. These leagues are controlled by the Royal Spanish Football Federation. The level of the opponents was of the same category, since the tournament was divided by competitive levels. The inclusion criteria were the following: participants who reported not having vision problems, not having partial/chronic injuries and not having neuropsychological problems that affected the experiment and, in addition, playing licensed soccer for ~5 years. All participants had experience performing the CMJ and using the sRPE and Wellness questionnaires. None of the analyzed participants presented previous injuries that could compromise the performance of the jump test. The participants were informed of the procedure to be performed. All legal guardians and players over 18 years signed the informed consent before beginning the investigation. The study protocol adhered to the principles of the Declaration of Helsinki and was approved by the institutional ethics committee.

Procedures

The research was carried out with U16 and U19 soccer players, during a 5-day stage during the month of December 2022. During this period, 3 friendly football matches were played on 3 consecutive days (Tuesday, Wednesday, and Thursday), at 6:00 p.m., 12:00 p.m., and 5:00 p.m., respectively. The matches followed the official regulations FIFA, with the exception that there was no limit on substitutions, although, once a player was substituted, he could not enter the match again. The matches lasted 80 minutes in the U16 category and 90 minutes in the U19 category. The evaluation of the CMJ was carried out pre- and post-match. The pre-test was carried out 1 hour before each match. The post-test was carried out just when the player was substituted and/or at the end of the match.

Regarding the sRPE, it was recorded 30 minutes after the end of the match (Campos-Vázquez, & Toscano-Belanda, 2018; Falces-Prieto et al., 2020a). For this, the sports scientist was responsible for obtaining this information and its subsequent recording and analysis. To do this, he asked each player in private (without the presence of other teammates, and without being able to see the values marked by the rest of his teammates), how demanding the match had been for him. Finally, the wellness questionnaire was controlled pre (1 hour before the game) and post-game (30 minutes after the end of the game). To do this, an individual paper form was handed out so that the players could fill in the items corresponding to pre- and post-match 1, pre- and post-match 2, and pre- and post-match 3. The data of all the variables were collected in paper format and later

registered in a spreadsheet in the Microsoft Windows® Excel program.

Instrumentation

A) *CMJ*: The jump height variable was obtained using the Chronojump-Boscosystem® jump platform (Barcelona, Spain) (De Blas et al., 2012; Pueo et al., 2018), which was connected to a laptop with a Windows® operating system. The measurements were made with Chronopic and recorded with the Chronojump version 1.4.7.0 software. Two jumping platforms (one per team) were used to promote efficiency in the evaluation. Three CMJ jumps were performed, with a recovery time of 20 seconds between jumps and an average of the three jumps for later analysis (De Hoyo et al., 2016; Falces-Prieto et al., 2020b). The CMJ was performed with the hands on the waist, performing a countermovement and jumping as high as possible and keeping the lower limbs extended throughout the flight phase (Bosco, Luhtanen, & Komi., 1983) Participants were instructed to perform the landing of each jump in an upright position and to flex their knees after landing (Sáez de Villarreal et al., 2015). The evaluation took place in the changing rooms of the sports facility, with the usual clothing and match boots.

B) *RPE*: sRPE was recorded after each match. To do this, 30 minutes after the end of each game, the players provided the value of PSE (arbitrary units, a.u.) taking into account the Borg-10 scale (Borg, 1970). All the players were previously familiar with the use of this tool, using it daily both in training and in competition. The training load based on sRPE was calculated by multiplying the training time in minutes by the sRPE score given by the players (Foster et al., 2001).

C) *Questionnaire for the evaluation of the state of well-being (wellness)*: The wellness questionnaire proposed by Campos-Vázquez & Toscano-Bendala (2014) and McLean et al., (2010) was used. To do this, the participants rated the five

evaluation parameters from 1 to 5: (fatigue, sleep quality, muscle damage, stress and mood), where 1 would be the most negative rating and 5 the most positive. The level of general well-being, and therefore the level of fatigue, that they present in each match and/or training session, was determined by adding the value of the 5 parameters of the questionnaire (range: 5-25). All players were previously familiar with the use of this tool, using it daily both in training and in competition.

Statistical analysis

Descriptive data are presented as mean \pm standard deviation (SD). The Shapiro-Wilk and Levene tests were performed to confirm the normal distribution and homogeneity of variance for all dependent variables using. A repeated measures analyses of variance (ANOVA) with Bonferroni post hoc tests were used to examine differences in sRPE, CMJ and Hooper questionnaire variables across the tournament differentiating between categories. Effect sizes (ES) were calculated using Cohen's ES and were interpreted as follows: <0.2 , trivial; 0.20 to 0.49 , small; 0.50 to 0.80 , moderate and >0.80 , large (Cohen, 1988). Pearson's product-moment correlation coefficients (r) were used to quantify the relationships among percentage of change showed in all variables. The magnitude of relationships was interpreted as follows: trivial, ≤ 0.10 ; small, $0.11-0.30$; moderate, $0.31-0.50$; large, $0.51-0.70$; very large, $0.71-0.90$; and nearly perfect, >0.90 (Hopkins, 2002). Statistical significance was set at $p < 0.05$ and the data analyses were carried out using the Statistical Package for Social Sciences (SPSS 25.0, Chicago, IL, USA).

Results

Descriptive data and changes in all variables across the tournament are shown in Table 1 and Figures 1 and 2.

Table 1.

Descriptive data and general differences in analyzed variables across the tournament.

Category	Variable	Pre	Match 1	Match 2	Match 3	P
U16	sRPE (AUs)	-	351.83 \pm 280.45	351.52 \pm 249.93	327.48 \pm 111.18	0.937
	CMJ (cm)	39.85 \pm 4.33	36.08 \pm 4.73	37.36 \pm 5.42	32.13 \pm 4.15	0.001
	Fatigue (AUs)	4.04 \pm 0.56	3.39 \pm 1.34	3.44 \pm 1.27	3.00 \pm 0.91	0.024
	Sleep (AUs)	4.17 \pm 0.72	4.22 \pm 0.80	4.35 \pm 0.71	3.87 \pm 1.01	0.186
	Soreness (AUs)	3.74 \pm 0.69	3.74 \pm 1.01	3.49 \pm 0.90	3.00 \pm 0.85	0.022
	Stress (AUs)	4.30 \pm 0.64	3.96 \pm 1.02	4.22 \pm 0.92	3.65 \pm 1.03	0.042
	Humor (AUs)	4.52 \pm 0.59	4.00 \pm 1.17	4.26 \pm 0.81	4.04 \pm 0.70	0.122
U19	sRPE (AUs)	-	352.95 \pm 189.86	470.21 \pm 294.18	403.11 \pm 256.57	0.951
	CMJ (cm)	38.93 \pm 3.98	37.43 \pm 4.52	36.49 \pm 6.63	31.55 \pm 4.29	0.001
	Fatigue (AUs)	3.95 \pm 0.62	2.95 \pm 0.78	2.32 \pm 0.95	2.58 \pm 1.22	0.001
	Sleep (AUs)	4.26 \pm 0.65	3.95 \pm 0.71	3.58 \pm 1.02	3.00 \pm 1.03	0.001
	Soreness (AUs)	4.11 \pm 0.74	3.21 \pm 0.79	2.26 \pm 0.87	2.53 \pm 0.77	0.001
	Stress (AUs)	4.16 \pm 0.83	3.68 \pm 1.06	2.84 \pm 1.07	3.11 \pm 1.10	0.001
	Humor (AUs)	4.32 \pm 0.67	3.90 \pm 0.99	3.16 \pm 0.96	3.16 \pm 1.21	0.001

Note: Pre = values prior to the first match; sRPE = session rating of perceived exertion; CMJ = countermovement jump; AU = arbitrary units. * Significant level set at $p < 0.05$; ** Significant level set at $p < 0.01$

Regarding to U16 age group, no differences in sRPE were observed, meanwhile differences in CMJ were observed when baseline values were compared with post-

match values ($p < 0.001$; ES = 0.46-1.78, small to large). Additionally, differences between CMJ values after the last match and first ($p < 0.001$; ES = 0.95, large) and second

($p < 0.001$; $ES = 1.26$, large) matches were presented. Differences in fatigue ($p < 0.05$; $ES = 1.14$, large), soreness ($p < 0.05$; $ES = 0.87$, large) and stress ($p < 0.05$; $ES = 0.63$, moderate) were observed when pre values were

compared to post-match values related to the third match. Also, differences in soreness were shown when first and third matches were compared ($p < 0.05$; $ES = 0.87$, large)

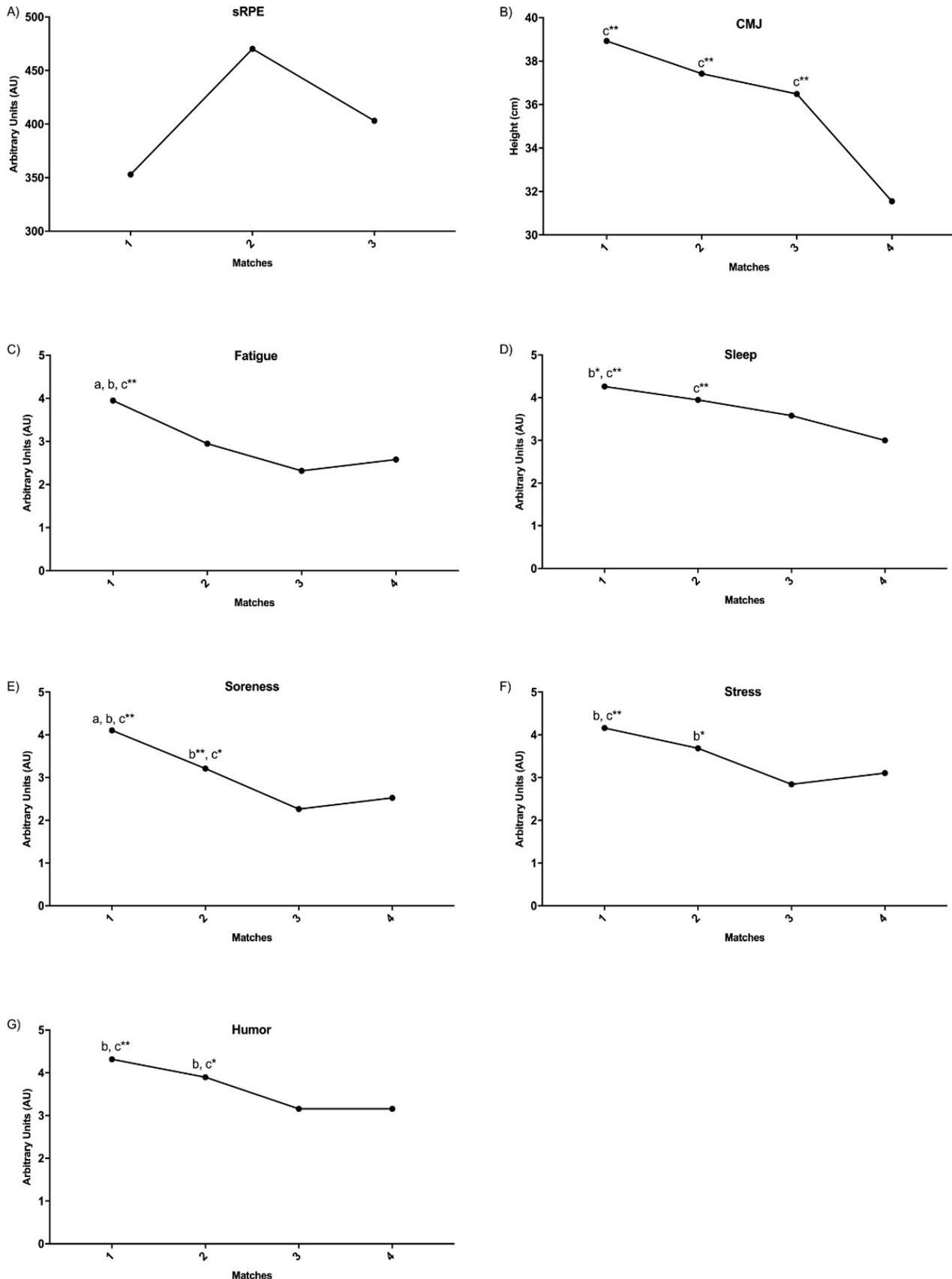


Figure 1. Changes in RPE, CMJ and wellness variables in U16 soccer players across the tournament

Similarly, no differences in sRPE were observed in the U19 age group. Differences in CMJ were observed when baseline values were compared with post-match values ($p < 0.001$; ES = 0.37-1.72, small to large) and also when the last match were compared to the first ($p < 0.001$; ES = 1.38, large) and the second ($p < 0.001$; ES = 1.15, large) matches. Regarding to the Hooper questionnaire variables, differences in fatigue and soreness were shown when pre values were compared to all the post-match values ($p <$

0.001; ES = 1.14-1.72, large). However, only differences with second and third matches were observed in sleep, stress and humor variables ($p < 0.05$; ES = 0.42-1.23, small to large). Finally, post-match values in the first match presented differences compared to the values registered in the second (soreness, stress and humor; $p < 0.05$; 0.77-1.09, moderate to large) and third (sleep, soreness and humor; $p < 0.05$; 0.52-0.61, moderate) matches.

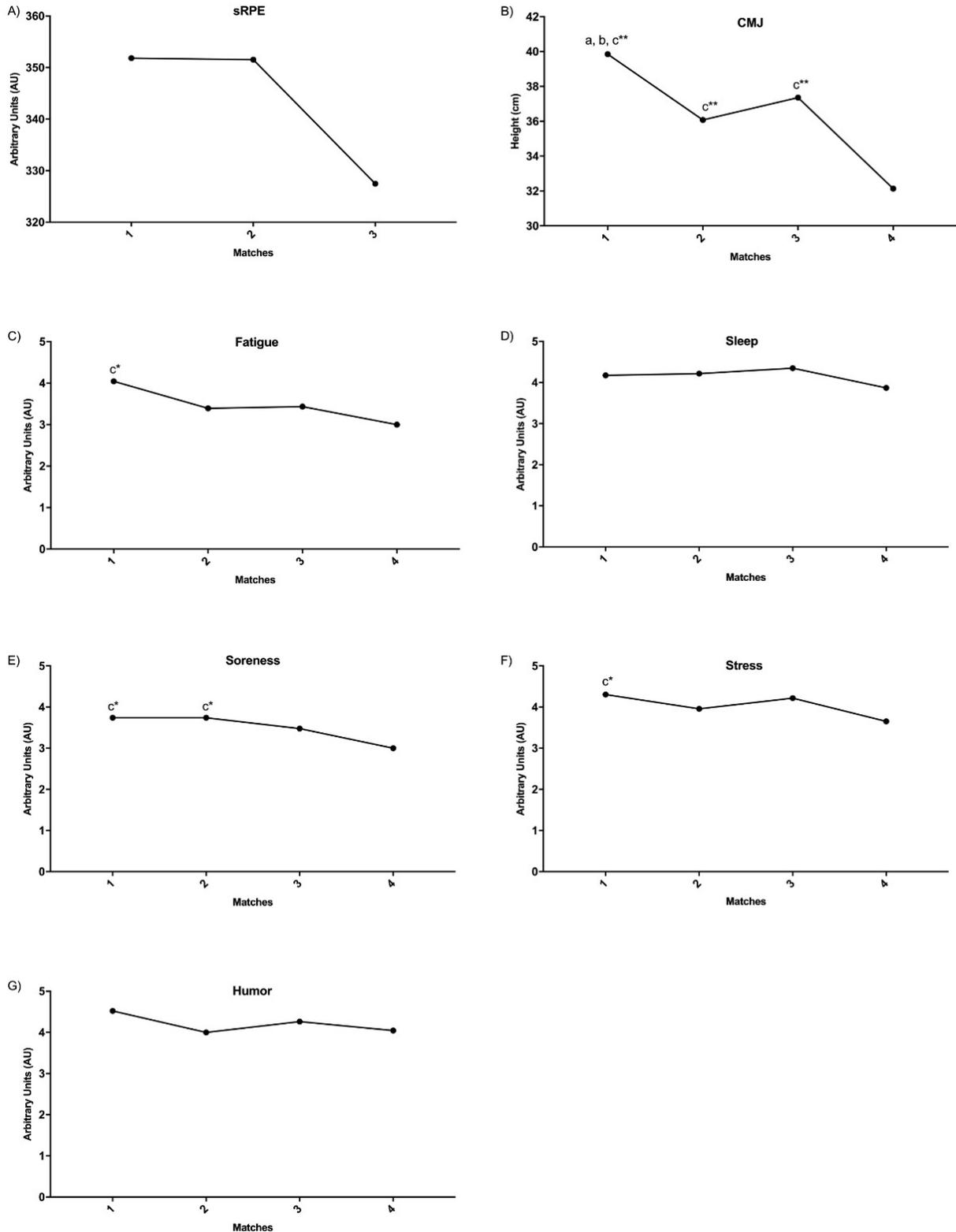


Figure 2. Changes in RPE, CMJ and wellness variables in U19 soccer players across the tournament.

In Table 2 are presented the relationships (r) between the percentage of change showed in all variables in each category group. In U16 age group, only positive relationships between fatigue and soreness ($r = 0.71$; $p < 0.001$; very large) were observed. In U19 age group, positive

relationships between fatigue and sleep ($r = 0.61$; $p < 0.001$; large), fatigue and soreness ($r = 0.87$; $p < 0.001$; very large), sleep and soreness ($r = 0.62$; $p < 0.001$; large) and stress and humor ($r = 0.67$; $p < 0.001$; large) were shown.

Table 2.

Relationships (r) between the percentage of change showed in all variables in each category group.

Category	Variable	Fatigue	Sleep	Soreness	Stress	Humor
U16	CMJ	0.18; S	0.37; M	0.12; S	0.33; M	-0.03; T
	Fatigue	-	0.31; M	0.71**; VL	0.20; S	0.03; T
	Sleep	-	-	0.35; M	0.16; S	0.03; T
	Soreness	-	-	-	-0.26; S	0.23; S
	Stress	-	-	-	-	0.24; S
	Humor	-	-	-	-	-
U19	CMJ	-0.19; S	-0.12; S	-0.14; S	0.18; S	0.16; S
	Fatigue	-	0.61**; L	0.87**; VL	0.18; S	0.16; S
	Sleep	-	-	0.62**; L	0.05; T	0.21; S
	Soreness	-	-	-	0.27; S	0.11; S
	Stress	-	-	-	-	0.67**; L
	Humor	-	-	-	-	-

Note: * Significant level set at $p < 0.05$; ** Significant level set at $p < 0.01$; Correlation magnitude: T, trivial; S, small; M: moderate; L, large; VL, very large; NP, near perfect.

Discussion

The aim of study was three-fold: (1) to determinate change assessment in height performance in CMJ post-friendly matches played in consecutive days of competitive tournaments in young soccer players, (2) to evaluate if exist significative correlation between shown in CMJ, minutes of playing performed and sRPE response, (3) and influence in Wellness after high match congestion. To the best of our knowledge, we have not found any other study that analyzes the results on CMJ, sRPE and Wellness after three matches played consecutively in young soccer players (U16 and U19). The main findings were: a) regarding to U16 category, differences in CMJ pre-and post-values and between third match and the previous ones were observed. It was found also differences in fatigue, soreness and stress when pre-values were compared with post values associated with the last match. b) With respect to U19 category, differences in CMJ were found when post-match values were analyzed. Differences in fatigue and soreness also appeared when pre-and post-values where compared. c) In regard to positive relationships, U16 age group showed this union between fatigue and soreness. In U19 category, positive relationships among fatigue and sleep and soreness, sleep and soreness and stress and humor.

It seems necessary to analyze the induced fatigue after a soccer match (Romagnoli et al., 2016) in order to establish key strategies to reduce the appearance of fatigue and to apply strategies to mitigate its effects (Doeven et al., 2018), especially during congested schedules. The findings of this study are in agreement with prior literature. Beato et al., (2018) found the inability to generate force when the players are fatigued, so the jump height is reduced and, consequently, sports performance also decreases. On the other hand, and in the same way as in our study, Barbosa de Lima Pinto et al., (2021) also evidenced, the decrease in performance in CMJ ($p < 0.001$) in young soccer players after

four official matches within a four day-period with a 24-h recovery interval between the matches. In this line, there are some studies that show a difference between fatigue and the decrease in height achieved in CMJ, with variable recovery times from 48h to 72h (Doeven et al., 2018; Varley et al., 2017). Consequently, the physical performance shown by the athletes as the competition progresses after each match played consecutively, could be lower (Romagnoli et al., 2016). Likewise, Hernández-Davó, Moreno-Pérez, & Moreno (2022), evidenced a decrease in the performance of the CMJ (ES: 0.81) in young soccer players, with 3 matches during a week. Following Brazier et al. (2019), both reactive force and vertical acceleration can be associated with lower extremity stiffness, being a key factor for physical performance and the risk of injury (Brazier et al., 2014; Lloyd et al., 2009).

Interestingly, regarding the sRPE used as a marker of the internal load. Our results have not shown significant differences across the matches (U16= $p < 0.937$; U17= $p < 0.951$). The present results are in line with previous findings reported by Moreira et al., (2016) who showed no increase in the sRPE for seven consecutive matches played in 7 days in youth soccer players. This result suggests, like Barbosa de Lima Pinto et al. (2021), that possible accumulated fatigue associated with participating in successive matches during the investigated competitive schedule did not influence the perceived intensity of youth soccer players. Measures of fatigue, sleep quality, muscle soreness, stress and total well-being showed substantial changes from match to match. These findings suggest that collected measures of player well-being are sensitive in detecting post-match fatigue after each match. These results would be in agreement with those found by Evans et al. (2022) and may have important implications for monitoring post-match fatigue in order to design action strategies both in training sessions and in upcoming matches in young soccer players. In the present study, fatigue and muscle soreness shown a

significant relationship in both categories ($r = 0,71$ para U16 y $r = 0,87$ para U19). Following Varley et al. (2017), also described a moderately positive relationship ($r = 0.52$) between neuromuscular fatigue and muscle soreness responses in soccer players. Given the great neuromuscular and mechanical demands, it seems evident that the resulting decrease in force production, structural damage and associated soreness after the completion of the three games played, the appearance of fatigue and its relationship with muscle soreness and the decrease in CMJ performance (Fitzpatrick et al., 2019; Maughan & Swinton, 2020).

Significant associations were found between CMJ, muscle soreness, stress, sleep quality and fatigue after the last match of the championship in the U16 category. To date, numerous studies have shown how these variables directly influence the player's performance and the possibility of suffering an injury (Huggins et al., 2019; Romero-Moraleda et al., 2020). However, the context in which this study is carried out shows how the increase in fatigue, muscle soreness and stress were significantly more relevant after the three matches were played. This could be explained since the accumulation and congestion of matches has been associated with the influence on well-being, fatigue and performance (Huggins et al., 2019; Maughan & Swinton, 2020), which seems to have more preponderance in young players and players with a lower competitive level (Rampinini et al., 2011; Romagnoli et al., 2016).

Conclusion

Congested fixtures such as tournaments may suppose a challenge to head and physical fitness and conditioning coaches managing load and avoiding fatigue. The present study shows how in the U16 category, the CMJ values collected before and after each match were lower due to the appearance of fatigue. Especially if the third game is compared with the previous ones. Likewise, the values of fatigue, muscle soreness and stress increased as the matches were played consecutively during the competition. Regarding the findings on the U19 category, differences are shown in CMJ after the end of each match. In addition, the values of fatigue and muscle soreness were associated after comparing the values before and after the match.

In this context, of competitive tournaments where multiple matches are played in a row, can challenge coaches and trainers to correctly handle loads and avoid fatigue. In this sense, coaches should distribute the exposure time to the high-intensity stimuli that arise during competitions to avoid, at least to a certain extent, the accumulation of sleep quality, stress, and fatigue. Health questionnaires such as the Hoop Index (based on fatigue, stress, muscle damage and sleep quality) are an interesting and useful tool for teams of youth players to manage and avoid fatigue, especially for injury prevention. On the other hand, there is a drop in performance after three consecutive matches, which is reflected in the lower height reached in the CMJ. These results should be used by coaches and fitness coaches

to make decisions on player lineups and substitutions during a match and as the tournament progresses.

Practical Applications

In this scenario of competitive tournaments, it is important that fitness coaches propose practical solutions that can reduce the accumulation of fatigue in periods of competition with several matches on consecutive days, because this fatigue could influence the state of well-being and physical performance of the players. Therefore, it is important to use recovery sessions or rest days of at least 48-72 hours between one match and the next. (Rico-González et al., 2021). Trying to maintain a healthy diet (Wade et al., 2019), establish recovery protocols after sports practice (Brink et al., 2010) and consider the state of well-being of the players prior to the session (Evans et al., 2022; Fitzpatrick et al., 2021), will allow planning in a more individualized way the demands required for each of the players. In this sense, this article has shown positive correlations in the change of stress, muscle soreness and CMJ. Data that seem to be in line with those found by Moalla et al. (2016), a study where it is determined that these variables are sensitive to load volume.

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Conflicts of Interest

The authors declare no conflict of interest.

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