CHANGES IN JUMP AND SPRINT PERFORMANCES DURING 14 PRESEASONS IN A SPANISH RESERVE ELITE SOCCER TEAM

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Abstract:

The aim of this study was to assess the changes in jump and sprint performances after the preseason period across 14 seasons depending on the initial performance level and the playing position in young professional soccer players. In total, 162 soccer players (age = 20.6 ± 1.8 years) belonging to the same reserve team of a Spanish *La Liga* club participated in this study. Countermovement jump (CMJ) and 5 and 15 m sprints were assessed in each season at the start of the preseason (July), Test 1 (T1), and the start of the competitive period (September), Test 2 (T2), from the 1998 to 2013 seasons. Considering all seasons, a trivial change was found in the sprint (5 m, Effect Size [ES] = −0.01; ±0.11, most-likely; and 15 m, ES = 0.05; ±0.09, most-likely) and countermovement jump (CMJ) performances (ES = −0.03; ±0.07; most-likely) after the preseason, but this varied across the seasons. While the fastest players in 5 m and 15 m tests and the most powerful worsened their performances in sprinting capacity (ES = 0.53–0.65, small very-likely) and in jump ability (ES = −0.54; ±0.25, small very-likely), respectively, the slowest players and the less powerful improved their performance likely/most-likely (ES = −0.33 and −0.68, small and moderate) and very-likely (ES = 0.40; ±0.20, small) after the precompetitive period. The changes in CMJ and sprinting were trivial and trivial/small for all tactical positions. The changes in neuromuscular performance after the preseason were not stable across the seasons and varied depending on the initial performance level. Individualization strategies should be considered in the design of strength and conditioning programs in order to optimize the training process.

Key words: *team sport, fitness, testing, sprinting, strength, football*

Introduction

Among other fitness parameters, jumping and sprinting capacities are crucial to keep up with play (Haugen, Tønnessen, & Seiler, 2013). Soccer players perform a total of 1 000 short-term actions (Bloomfield, Polman, & O'Donoghue, 2007; Sarmento, et al., 2014; Stølen, Chamari, Castagna, & Wisløff, 2005) out of which 220 are high-intensity efforts (Di Salvo, et al., 2007; Lago, Casais, Dominguez, & Sampaio, 2010; Rampinini, Coutts, Castagna, Sassi, & Impellizzeri, 2007) during official matches, each lasting two to four seconds (Stølen, et al., 2005; Vigne, Gaudino, Rogowski, Alloatti, & Hautier, 2010) on average. Even though these type of efforts only represent eight to 12% of the total covered running distance, these capabilities are considered critical (Haugen, et al., 2013) because lineal straight sprinting actions are the most frequent in goal situations (Faude, Koch, & Meyer, 2012). Therefore, it is necessary to evaluate the jumping and sprinting performance throughout the competitive season, and especially after the precompetitive period. This period is used by technical staff so that soccer players can achieve the level of performance required to compete from the first official match.

Without considering the studies that compare the effects of strength and conditioning intervention programs, the progress in neuromuscular performance (i.e., jumping and sprinting) after the precompetitive period remains unclear in soccer players. High level Portuguese (Silva, et al., 2011), Tunisian professional (Fessi, et al., 2016), and English semi-professional (Caldwell & Peters,

2009) soccer players improved their performance in countermovement jump (CMJ) and CMJ with arm swing during the preseason period, whereas the change was insubstantial in CMJ performance for elite Spanish (Lago-Penas, Rey, Lago-Ballesteros, Dominguez, & Casais, 2013) and Norwegian (Haugen, 2018) professional soccer players. Similarly, while Tunisian (Fessi, et al., 2016) and Norwegian (Haugen, 2018) professional, English semi-professional (Caldwell & Peters, 2009), and NCAA Division III (Magal, Smith, Dyer, & Hoffman, 2009) soccer players enhanced their sprinting performance slightly after the preseason period, several studies did not find any significant differences in the neuromuscular parameters in Spanish and Portuguese elite soccer players (Lago-Penas, et al., 2013; Silva, et al., 2011). Therefore, impairment in neuromuscular performance after the preparatory period is not expected, but the improvement is unclear.

Among other factors, the disparity in the competitive levels of the investigated players (Caldwell & Peters, 2009; Fessi, et al., 2016; Haugen, 2018; Lago-Penas, et al., 2013; Magal, et al., 2009; Silva, et al., 2011), the training strategies and their associated training load (Castagna, Impellizzeri, Chaouachi, Bordon, & Manzi, 2011; Los Arcos, Martínez-Santos, Yanci, Mendiguchia, & Méndez-Villanueva, 2015; Manzi, Bovenzi, Franco Impellizzeri, Carminati, & Castagna, 2013), the tests used to assess neuromuscular performance (Caldwell & Peters, 2009; Fessi, et al., 2016; Haugen, 2018; Lago-Penas, et al., 2013; Magal, et al., 2009; Silva, et al., 2011), and the length of the preseason period (Caldwell & Peters, 2009; Fessi, et al., 2016; Haugen, 2018; Lago-Penas, et al., 2013; Magal, et al., 2009; Silva, et al., 2011) could explain the unclear tendency in the changes in neuromuscular performance after the preseason period. In addition, most of the studies assessed a unique team during one preseason period and did not take into account the initial performance level of the players (Caldwell & Peters, 2009; Fessi, et al., 2016; Haugen, 2018; Lago-Penas, et al., 2013; Magal, et al., 2009; Silva, et al., 2011). For these reasons, comparisons among the studies and interpretation of the results are difficult. Therefore, it would be interesting to assess the evolution in neuromuscular performance in the same team to secure alike competitive level and age considering the initial level of the players during several preseason periods (i.e., weeks) of a similar duration and with a sample as large as that used by Haugen et al. (2013) and Los Arcos and Martins (2018). Moreover, taking into account that the physical match performances vary during a soccer match depending on the tactical position (Di Salvo, et al., 2010; Méndez-Villanueva & Buchheit, 2011; Sarmento, et al., 2014), it would be interesting to examine the impact of the preseason period on players in each playing position.

Therefore, the aim of this study was to examine changes in neuromuscular performance after the preseason period across 14 seasons depending on the initial performance level and the playing position of young elite soccer players belonging to the reserve team of an elite Spanish club.

Methods

Participants

One hundred and sixty-two young soccer players (body height = 1.80 ± 0.06 m; body mass = 74.2 ± 6.1 kg) belonging to the same reserve team of a Spanish *La Liga* club participated in this study. They competed in the Spanish 2nd B division championship and had at least eight years of soccer training experience. Players were classified regarding their tactical position (Bradley, et al., 2009; Carling, Le Gall, & Dupont, 2012; Lago, et al., 2010): goalkeeper (G) (n=12), lateral defender (LD) (n=33), central defender (CD) (n=22), lateral midfielder (LM) (n=23), central midfielder (CM) (n=30), and attacker (A) (n=42). The study was conducted according to the Declaration of Helsinki and was approved beforehand by the local ethics committee.

Procedure

Young (age = 20.6 ± 1.8 years) elite soccer players (n = 162) were assessed on CMJ and sprint test (i.e., time in 5 m and 15 m) twice: on the first or second day of the preseason period (i.e., July), Test 1 (T1), and at the start of the competitive period, six to eight weeks later (i.e., September), Test 2 (T2), at least once from the 1998/1999 to 2012/2013 seasons. All tests were performed on the same surface and conducted by the same experienced testing administrators. Before each testing session, a standardized warm-up was performed consisting of 5-min self-paced low-intensity running, mobility exercises, lunges and sprinting drills. All athletes were familiarized with the tests due to their previous testing routines. The 1999/2000 season was excluded because T1 was assessed a month into the precompetitive period. Since some players belonged to the team for more than one season, 290 occurrences were registered.

Physical fitness assessment

Jumping Test (CMJ). Participants were asked to perform a maximal countermovement vertical jump on a jumping mat (Newtest OY, Oulu, Finland) with their hands fixed on the hips. Players performed the jump so to lower themselves from an extended leg position down to the 90º knee flexion that was immediately followed by a subsequent concentric action for maximal height, where they were instructed to land on the contact platform in a position similar to that of the take-off (Bosco, Luhtanen,

& Komi, 1983). The jumping height was calculated from the flight time. A set of three maximal jumps was recorded, interspersed with approximately 10 seconds of rest between the jumps. The best jump was used for further analyses.

Sprint test. Each soccer player performed a sprinting test consisting of three maximal sprints over 15 m, with a 120-second rest period between each sprint, thus having enough time to walk back to the start and wait for another turn as previously described by Gorostiaga et al. (2009) and Los Arcos et al. (2014). Participants were located 0.5 m away from the starting point, and they began the test when they felt ready (Gorostiaga, et al., 2009; Los Arcos, et al., 2014). Time was recorded using photocell gates (Microgate® Polifemo, Bolzano, Italy) placed 0.4 m above the ground, with an accuracy of ±0.001 s. The timer was activated automatically as the players passed through the first gate at the 0.0 m mark, and split times were then recorded as time in 5 m and 15 m sprints. The best time in each distance was used for further analyses.

Statistical analysis

Standard statistical methods were used for the calculation of the means and standard deviations (SD). In order to adjust the analysis to the initial level of performance, the sample (i.e., occurrences) was split into four groups according to the corresponding percentile values of T1. Practical differences in neuromuscular performance (i.e., 5 m, 15 m, and CMJ) between T1 and T2 were assessed by calculating the Cohen's d effect size (Cohen, 1988). Effect sizes (ES) between < 0.2, 0.2–0.6, 0.6–1.2, 1.2–2, and 2.0–4.0 were considered as trivial, small, moderate, large, and very large, respectively (Hopkins, Marshall, Batterham, & Hanin, 2009). Probabilities were also calculated to establish whether the true (unknown) differences were

Table 1. Changes in sprint performance (i.e., 5 m and 15 m) after the preseason across 14 competitive seasons (N = 239 occurrences)

Season	Technical staff	Players	T1 (s)	T2 (s)	Change in mean (%)	ES	MBI	
1998/1999	1	18	0.96 ± 0.02	0.95 ± 0.02	-1.9 ± 1.3	-0.85; ±0.58	0/3/97	Very likely ↑
			2.28 ± 0.04	2.27 ± 0.05	-0.9 ± 0.9	-.044; ±0.44	1/16/83	Likely ↑
2000/2001	2	17	0.94 ± 0.03	0.93 ± 0.03	-0.4 ± 1.4	-0.12; ±0.48	13/49/38	Unclear
			2.28 ± 0.06	2.27 ± 0.06	-0.1 ± 1.0	-0.03; ±0.37	15/65/20	Unclear
2001/2002	2	15	0.94 ± 0.02	0.96 ± 0.02	2.5 ± 1.4	0.94; ±0.52	99/1/0	Very likely ↓
			2.27 ± 0.05	2.32 ± 0.06	1.7 ± 0.6	0.68; ±0.25	100/0/0	Most likely ↓
2002/2003	2	19	0.96 ± 0.03	0.96 ± 0.03	0.6 ± 1.0	0.20; ±0.36	50/47/4	Possibly ↓
			2.29 ± 0.04	2.29 ± 0.05	0.3 ± 0.7	0.13; ±0.32	34/61/5	Unclear
2003/2004	3	17	0.96 ± 0.02	0.97 ± 0.03	0.9 ± 1.0	0.33; ±0.36	74/25/1	Possibly ↓
			2.30 ± 0.06	2.31 ± 0.04	0.1 ± 0.7	0.03; ±0.30	17/74/10	Unclear
2004/2005	4	17	0.95 ± 0.02	0.94 ± 0.03	-1.2 ± 1.6	-0.45; ±0.55	3/19/78	Likely ↑
			2.27 ± 0.05	2.28 ± 0.06	-0.0 ± 1.0	-0.02; ±0.43	19/58/23	Unclear
2005/2006	5	18	0.97 ± 0.02	0.95 ± 0.03	-2.4 ± 1.7	-0.84; ±0.58	0/3/96	Very likely ↑
			2.32 ± 0.06	2.31 ±0 .05	-0.8 ± 0.9	-0.32; ±0.36	1/27/72	Possibly ↑
2006/2007	6	18	0.96 ± 0.03	0.96 ± 0.03	-0.3 ± 1.0	-0.11; ±0.32	5/63/32	Unclear
			2.29 ± 0.05	2.32 ± 0.06	0.7 ± 0.9	0.27; ±0.36	64/34/2	Possibly ↓
2007/2008	6	16	0.98 ± 0.03	0.99 ± 0.04	1.0 ± 1.9	0.25; ±0.47	57/37/6	Unclear
			2.33 ± 0.05	2.34 ± 0.05	0.7 ± 1.7	0.30; ±0.75	60/28/12	Unclear
2008/2009	7	20	0.96 ± 0.03	0.97 ± 0.04	1.6 ± 1.9	0.43; ±0.49	79/19/2	Likely ↓
			2.30 ± 0.06	2.32 ± 0.06	0.5 ± 0.7	0.17; ±0.24	42/57/1	Possibly
2009/2010	7	19	0.97 ± 0.04	0.96 ± 0.04	-0.4 ± 2.4	-0.10; ±0.62	20/40/39	Unclear
			2.31± 0.07	2.30 ± 0.08	-0.4 ± 1.1	-0.12; ±0.32	5/62/32	Unclear
2010/2011	7	15	0.95 ± 0.04	0.94 ± 0.03	-1.9 ± 1.7	-0.54; ±0.44	1/9/90	Likely ↑
			2.29 ± 0.10	2.27 ± 0.08	-0.8 ± 1.1	-0.21; ±0.29	1/46/52	Possibly ↑
2011/2012	7	17	0.95 ± 0.04	0.96 ± 0.03	0.3 ± 1.6	0.07; ±0.42	30/5714	Unclear
			2.27 ± 0.07	2.28 ± 0.07	0.6 ± 1.0	0.19; ±0.30	49/49/2	Possibly ↓
2012/2013	7	13	0.97 ± 0.03	0.95 ± 0.02	-2.1 ± 1.4	-0.76; ±0.50	0/3/97	Very likely ↑
			2.29 ± 0.05	2.27 ± 0.05	-1.1 ± 0.7	-0.48; ±0.30	0/6/94	Likely ↑

Note. ES = effect size; MBI = magnitude-based inference; ↑ = performance increase; ↓ = performance decrease; T1 = pre-preseason test; T2 = post-preseason test.

lower, similar, or higher than the smallest worthwhile difference or change (0.2 multiplied by the between-subject SD, based on the Cohen's effect size principle). Quantitative chances of higher or lower differences were evaluated qualitatively as follows: < 1%, almost certainly not; 1−5%, very unlikely; 5−25%, unlikely; 25−75%, possible; 75−95%, likely; 95−99%, very-likely; > 99%, almost certain. If the chances of having higher or lower values than the smallest worthwhile difference were both >5%, the true difference was assessed as unclear. Data analysis was performed using a modified statistical Excel spreadsheet (Hopkins, 2006).

Results

Taking the 14 seasons together (n = 239 occurrences), a trivial change was found in sprint performance after the preseason period (i.e., from T1 to T2): a) 5 m: from 0.96 ± 0.03 s to 0.96 ± 0.03 s (ES = −0.01; ± 0.11, most-likely 0/100/0, change in mean 0.0 ± 0.4%) and b) 15 m: from 2.29 ± 0.06 s to 2.30 ± 0.06 s (ES = 0.05; ±0.09, most-likely 0/100/0, change in mean, 0.1 ± 0.2%). Table 1 shows the changes in sprinting capacity in each season from 1998/1999 to 2012/2013. These varied in sign (i.e., positive and negative) and magnitude (trivial/small/moderate) across the seasons.

After the division of the sample (i.e., occurrences) into four percentiles attending to the initial sprint performance at preseason, the following groups were considered: G1, 5 m < 0.94 s and 15 m < 2.25 s; G2, 5 m = 0.94–0.95 s and 15 m = 2.25–2.28 s; G3, 5 m = 0.96–0.97 s and 15 m = 2.29–2.32 s; and G4, 5 m ≥ 0.98 s and 15 m ≥ 2.33 s. While the fastest players in the 5 m and 15 m tests (i.e., G1) worsened their performance in sprinting after the preseason (ES= 0.53–0.65; very-likely), the slowest players (i.e., G4) improved their performance from likely to most-likely (ES = 0.33–0.68) (Table 2).

Table 2. Change in sprint performance (i.e., 5 m and 15 m) after the preseason according to the initial performance level groups

Group	Time (s)	Occurrences	T1	T2	Change in mean (%)	ES	MBI	
1	<0.94	50	0.92 ± 0.01	0.93 ± 0.02	1.3 ± 0.6	0.65; ±0.31	99/1/0	Very likely ↓
	<2.25	52	2.22 ± 0.03	2.24 ± 0.05	0.9 ± 0.4	0.53; ±0.25	98/2/0	Very likely ↓
2	0.94 -0.95	61	0.95 ± 0.00	0.95 ± 0.02	0.3 ± 0.6	0.16; ±0.34	43/54/4	Possibly ↓
	2.25 - 2.28	60	2.27 ± 0.01	2.28 ± 0.05	0.6 ± 0.5	0.42; ±0.35	85/15/0	Likely ↓
3	0.96 – 0.97	63	0.97 ± 0.01	0.97 ± 0.03	0.1 ± 0.8	0.08; ±0.35	28/63/10	Unclear
	2.29 - 2.32	61	2.30 ± 0.01	2.31 ± 0.04	0.2 ± 0.4	0.17; ±0.34	43/53/4	Possibly ↓
4	≥0.98	65	0.99 ± 0.02	0.97 ± 0.04	-.2.0 ± 0.8	-0.68; ±0.29	0/0/100	Most likely ↑
	≥2.33	65	2.37 ± 0.04	2.35 ± 0.05	-0.6 ± 0.5	-0.33; ±0.24	0/19/81	Likely ↑

Note. ES = effect size; MBI = magnitude-based inference; ↑ = performance increase; ↓ = performance decrease; T1 = pre-preseason test; T2 = post-preseason test.

Table 3. Changes in jump performance (CMJ) after the preseason across 14 years (N = 239 occurrences)

Season	Technical staff	Players	T1 (cm)	T2 (cm)	Change in mean (%)	ES	MBI	
1998/1999	1	18	46.0 ± 4.2	45.3 ± 4..3	-2.3 ± 3.2	-0.22; ±0.34	2/43/55	Possibly ↓
2000/2001	2	18	45.3 ± 4.5	46.1 ± 4.0	2.0 ± 2.2	0.20; ±0.22	49/51/0	Possibly ↑
2001/2002	2	14	45.8 ± 5.9	44.1 ± 6.2	-3.7 ± 3.0	-0.26; ±0.19	0/31/69	Possibly ↓
2002/2003	2	19	45.4 ± 4.8	45.1 ± 3.9	-1.4 ± 3.0	-0.15; ±0.29	3/58/39	Possibly ↓
2003/2004	3	17	45.8 ± 3.2	46.0 ± 3.1	1.1 ± 3.0	0.16; ±0.42	44/49/7	Unclear
2004/2005	4	17	48.0 ± 4.5	45.4 ± 2.9	-5.1 ± 2.4	-0.64; ±0.29	0/1/99	Very Likely ↓
2005/2006	5	19	44.6 ± 4.6	44.0 ± 5.3	-0.4 ± 2.7	-0.01; ±0.23	6/85/9	Unclear
2006/2007	6	18	43.5 ± 3.9	44.1 ± 4.1	1.1 ± 2.2	0.11; ±0.22	23/76/1	Likely ↑
2007/2008	6	14	45.9 ± 2.2	44.4 ± 3.5	-2.4 ± 2.5	-0.34; ±0.36	1/23/76	Likely ↓
2008/2009	7	20	44.8 ± 4.5	45.1 ± 4.9	0.7 ± 2.6	0.08; ±0.23	19/78/3	Likely ↑
2009/2010	7	17	43.7 ± 4.7	43.7 ± 5.1	-0.3 ± 3.3	-0.01; ±0.24	7/84/9	Unclear
2010/2011	7	16	41.0 ± 11.2	43.1 ± 4.8	18.2 ± 37.2	0.27; ±0.60	58/33/9	Unclear
2011/2012	7	18	41.7 ± 4.9	43.2 ± 4.9	3.7 ± 2.4	0.28; ±0.19	78/22/0	Likely ↑
2012/2013	7	13	41.9 ± 4.3	42.9 ± 4.2	3.9 ± 2.9	0.36; ±0.27	85/15/0	Likely ↑

Note. ES = effect size; MBI = magnitude-based inference; ↑ = performance increase; ↓ = performance decrease; T1 = pre-preseason test; T2 = post-preseason test.

Taking the 14 seasons together (n = 239 occurrences), a most-likely (0/100/0) and trivial (ES = −0.03; ±0.07, from 44.7 ± 4.7 to 44.5 ± 4.5 cm, change in mean -0.3 ± 0.7%) worsening was found in CMJ after the precompetitive period. Table 3 shows the changes in CMJ in each season from 1998/1999 to 2012/2013. These varied in sign (i.e., positive and negative) and magnitude (trivial/small/moderate) across the seasons.

After the division of the sample (i.e., occurrences) into four percentiles attending to the initial CMJ performance at preseason, the following groups were considered: G1, CMJ < 41.5 cm; G2, CMJ = 41.5–44.7 cm; G3, CMJ = 44.8–47.6 cm; and G4, CMJ ≥ 47.7 cm. While the players with the highest CMJ values worsened their performance (ES = −0.54; ±0.25, small, very-likely), the players with the lowest CMJ values in T1 improved their

Table 4. Change in jump performance (CMJ) after the preseason according to the initial performance level groups

Group	Height (cm)	Occurrences	T1	T2	Change in mean (%)	ES	MBI	
1	<41.5	59	38.8 ± 2.1	39.8 ± 2.8	2.5 ± 1.3	0.40; ±0.20	95/5/0	Very likely ↑
2	41.5 -44.7	56	43.1 ± 1.0	43.1 ± 2.5	-0.0 ± 1.4	-0.06; ±0.32	9/68/23	Unclear
3	44.8 – 47.6	62	46.1 ± 0.9	45.8 ± 2.7	-0.2 ± 1.5	-0.01; ±0.33	15/68/17	Unclear
4	≥47.7	62	50.5 ± 2.6	49.0 ± 3.3	-3.4 ± 1.6	-0.54; ±0.25	0/1/99	Very likely ↓

Note. ES = effect size; MBI = magnitude-based inference; ↑ = performance increase; ↓ = performance decrease; T1 = pre-preseason test; T2 = post-preseason test.

Table 5. Change in sprint performance (i.e., 5 m and 15 m) after the preseason according to the tactical positions

	N	Occurrences	Test	T1 (s)	T2 (s)	Change in mean (%)	ES	MBI	
G	10	17	5m	0.97 ± 0.03	0.96 ± 0.02	0.2 ± 1.3	0.06; ±0.49	31/51/18	Unclear
			15m	2.31 ± 0.07	2.30 ± 0.07	-0.2 ± 0.9	-0.06; ±0.28	7/74/19	Unclear
LD	18	46	5m	0.96 ± 0.03	0.96 ± 0.03	-0.5 ± 1.0	-0.26; ±0.31	1/37/62	Possibly ↑
			15m	2.30 ± 0.06	2.30 ± 0.06	0.0 ± 0.6	0.01; ±0.23	9/85/6	Unclear
CD	21	39	5m	0.97 ± 0.03	0.96 ± 0.03	-0.7 ± 1.1	-0.26; ±0.38	3/38/60	Possibly ↑
			15m	2.30 ±0.05	2.30 ± 0.05	-0.4 ± 0.7	-0.05; ±0.33	10/68/22	Unclear
LM	22	36	5m	0.95 ±0.03	0.95 ± 0.03	1.0 ± 0.6	0.33; ±0.22	85/15/0	Likely ↓
			15m	2.26 ± 0.06	2.29 ± 0.06	1.1 ± 0.9	0.40; ±0.32	85/15/0	Likely ↓
CM	28	42	5m	0.97 ± 0.02	0.97 ± 0.04	0.1 ± 0.9	0.05; ±0.28	19/75/6	Unclear
			15m	2.32 ± 0.05	2.32 ± 0.06	-0.2 ± 0.6	-0.07; ±0.23	3/80/17	Likely ↑
A	40	59	5m	0.95 ± 0.03	0.95 ± 0.04	0.8 ± 0.9	0.23; ±0.24	59/41/0	Possibly ↓
			15m	2.27 ± 0.06	2.28 ± 0.06	0.4 ± 0.5	0.29; ±0.19	79/21/0	Likely ↓

Note. G = goalkeepers; LD = lateral defenders; CD = central defenders; LD = lateral midfields; CM = central midfields; A = attackers; ES = effect size; MBI = magnitude-based inference; ↑ = performance increase; ↓ = performance decrease; T1 = pre-preseason test; T2 = post-preseason test.

Table 6. Change in jump performance (CMJ) after the preseason according to the tactical positions

	N	Occurrences	T1 (cm)	T2 (cm)	Change in mean (%)	ES	MBI	
G	11	18	43.5 ± 5.1	43.8 ± 4.9	0.7 ± 3.0	0.05; ±0.24	14/82/4	Unclear
LD	30	48	44.5 ± 4.8	44.7 ± 4.9	0.9 ± 1.6	0.09; ±0.14	10/90/0	Likely ↑
CD	21	38	44.8 ± 4.4	44.6 ± 3.7	0.5 ± 1.8	0.03; ±0.19	8/90/2	Likely ↓
LM	21	35	45.3 ± 4.6	44.5 ± 4.0	-.1.0 ± 2.2	-0.11; ±0.22	1/75/24	Possibly ↓
CM	28	42	43.1 ± 3.6	43.3 ± 3.9	-0.3 ± 1.8	-0.04; ±0.21	3/88/9	Likely ↑
A	39	58	46.0 ± 5.1	45.3 ± 5.0	-0.6 ± 1.3	-0.05; ±0.11	0/99/1	Very likely ↓

Note. G = goalkeepers; LD = lateral defenders; CD = central defenders; LD = lateral midfields; CM = central midfields; A = attackers; ES = effect size; MBI = magnitude-based inference; ↑ = performance increase; ↓ = performance decrease; T1 = pre-preseason test; T2 = post-preseason test.

performance (ES = 0.40; ±0.20, small, very-likely) (Table 4).

Most of the changes in the sprint performance according to the tactical positions were trivial to small and possible to likely. LMs and As worsened in the 5 m and 15 m performances (ES = 0.23–0.40; possibly/likely) (Table 5).

The change in CMJ performance after the preseason was trivial for all tactical positions (Table 6).

Discussion and conclusions

The purpose of this study was to examine the changes in neuromuscular performance after the preseason period across 14 seasons in 162 players depending on their initial performance level and playing position of young elite soccer players belonging to the same reserve team of a Spanish elite club. The main findings of the present study were: a) the changes in sprint and jump performances vary in sign (negative or positive) and magnitude (from unclear to moderate) after the preseason periods; b) while the players with the lowest neuromuscular performance improved their performance, those with the greatest performance worsened after the preseason period; and c) minor practical differences among tactical positions were found in the change in sprint and jump performance after the preseason period.

Considering 14 seasons, 162 players and 290 occurrences altogether, a most-likely trivial change was found in neuromuscular performance (i.e., 5 m and 15 m sprinting and CMJ) after the preseason period, but the changes varied differently across the seasons not only in sign (negative or positive) but also in magnitude (trivial, small, or moderate). Similarly, contradictory results have been found in studies that assessed the changes in jumping and sprinting during the preseasonal period of a single season. Portuguese elite soccer players maintained their performance in the 5 m and 30 m sprint distances (Silva, et al., 2011), Spanish First Division players maintained their performance in CMJ, squat jump, and Abalakov jumping tests (Lago-Penas, et al., 2013), and CMJ performance was similar during the preseason and in-season periods for Norwegian elite players (Haugen, 2018). In contrast, the same Portuguese players improved their performance in CMJ by ≈5% ($p<.05$) (Silva, et al., 2011) and Tunisian professional players enhanced their sprinting performance after several precompetitive training weeks (Fessi, et al., 2016). Therefore, after the examination of several precompetitive periods in the same team with a very large sample, a clear tendency in the changes in neuromuscular performance (i.e., sprinting and jumping) is not expected in young professional soccer players who are trained to play elite soccer, making it necessary to assess other factors.

It seems that the initial performance level of the players (i.e., before the preseason period) affects the sign and magnitude of the changes in neuromuscular performance after the preparation period. In both neuromuscular parameters (i.e., sprint and jump performances), the players with the lowest initial performance (i.e., 5 m ≥ 0.98 s, 15 m ≥ 2.33, and CMJ < 41.5) improved their performance substantially, while the players with the greatest initial neuromuscular performance (i.e., 5 m < 0.94 s, 15 m < 2.25, and CMJ ≥ 47.7) worsened. It can be suggested that the lower initial neuromuscular performance, the better the effects are after this training period (ES = small/moderate). In this line, Nakamura, Pereira, Rabelo, Ramirez-Campillo, and Loturco (2016) found that the initial sprinting speed presented a *nearly perfect* negative correlation with the absolute loss in this ability over the preseason in professional Brazilian futsal players (19.1 ± 0.8 years). This suggests that the preseason period is more beneficial to the neuromuscular performance of the slower and less powerful players than the rest of the players, maybe due to the impact (Los Arcos, et al., 2015; Nakamura, et al., 2016) of a high training load accumulated by the players during this period (Algrøy, Hetlelid, Seiler, & Stray Pedersen, 2011; Impellizzeri, et al., 2006; Jeong, Reilly, Morton, Bae, & Drust, 2011; Los Arcos, et al., 2015). In addition, for the first time, we examined the changes in neuromuscular performance across several seasons and considering the tactical positions of young professional soccer players who were trained to play elite soccer. The sizes of the changes in the height achieved in CMJ and in the time registered in 5 m and 15 m sprints (Tables 5 and 6) were trivial and small in all tactical positions. This suggests that the preseason period similarly affects all tactical positions in neuromuscular performance, being more relevant to the initial performance level of the players.

The most-likely trivial change in neuromuscular fitness parameters (i.e., sprint and jump performances) of young elite soccer players after the preseason period is not stable across the seasons and varies depending on their initial performance. The technical staff should consider the initial neuromuscular performance of the players when designing the preseason training strategies, enforcing the individualization of the training process across the season.

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