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EFEITO DE UMA TEMPORADA DE TREINAMENTO SOBRE INDICADORES MULTIDIMENSIONAIS DO POTENCIAL ESPORTIVO DE JOVENS FUTEBOLISTAS

EFFECT OF A TRAINING SEASON ON MULTIDIMENSIONAL INDICATORS OF SPORTING POTENTIAL OF YOUNG SOCCER PLAYERS

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EFEITO DE UMA TEMPORADA DE TREINAMENTO SOBRE INDICADORES MULTIDIMENSIONAIS DO POTENCIAL ESPORTIVO DE JOVENS FUTEBOLISTAS

RESUMO

Introdução: A performance no futebol resulta de uma combinação de fatores, como as características físicas dos jogadores, habilidades psicológicas, técnicas e táticas, sendo a maioria delas treináveis.

Objetivo: Investigar o efeito de uma temporada de treinamento sobre indicadores multidimensionais do potencial esportivo de jovens futebolistas.

Metodologia: Participaram do estudo 18 futebolistas do sexo masculino das categorias sub-14, sub-15, sub-16 e sub-17 (14,4 ± 1,3 anos; 59,2 ± 9,0 kg; 170,5 ± 9,3 cm), que treinavam de três a cinco vezes por semana em um centro de formação brasileiro de jovens futebolistas. Os atletas foram submetidos a uma bateria de testes multidimensional, antes e após 11 meses de uma temporada de treinamento, sendo avaliados indicadores antropométricos, físico-motores, psicológicos, técnico-táticos, socioambientais e a maturação biológica, além da percepção subjetiva dos treinadores quanto ao potencial esportivo dos atletas.

Resultados: Após a temporada, foi observado aumento significativo nos indicadores antropométricos (estatura, massa corporal e envergadura) e redução no percentual de gordura. Além disso, os jogadores tiveram melhora significativa na força de preensão manual, flexibilidade, potência do salto com contramovimento, agilidade, velocidade de 20 metros, indicadores psicológicos, drible e habilidades táticas.

Conclusão: Conclui-se que uma temporada de treinamento promoveu melhoras significantes nos indicadores multidimensionais do potencial esportivo de jovens futebolistas.

Palavras-chave: Futebol. Treinamento. Indicadores Multidimensionais. Características de Performance.

EFFECT OF A TRAINING SEASON ON MULTIDIMENSIONAL INDICATORS OF SPORTING POTENTIAL OF YOUNG SOCCER PLAYERS

ABSTRACT

Introduction: Performance in soccer results from a combination of factors, such as the players' physical characteristics, psychological, technical and tactical skills, most of which are trainable.

Objective: Investigate the effect of a training season on multidimensional indicators of the sporting potential of young footballers.

Methodology: Eighteen male soccer players from the under-14, under-15, under-16 and under-17 categories participated in the study (14.4 ± 1.3 years; 59.2 ± 9.0 kg; 170.5 ± 9, 3 cm), who trained three to five times a week at a brazilian training center for young soccer players. The athletes were subjected to a battery of multidimensional tests, before and after 11 months of a training season, evaluating anthropometric, physical-motor, psychological, technical-tactical, socio-environmental indicators and biological maturation, in addition to the coaches' subjective perception regarding the sporting potential of athletes.

Results: After the season, a significant increase in anthropometric indicators (height, body mass and wingspan) and a reduction in fat percentage were observed. In addition, the players had significant improvements in handgrip strength, flexibility, countermovement jumping power, agility, 20-meter speed, psychological indicators, dribbling and tactical skills.

Conclusion: It is concluded that a training season promoted significant improvements in the multidimensional indicators of the sporting potential of young footballers.

Keywords: Soccer. Training. Multidimensional Indicators. Performance Characteristics.

1. INTRODUCTION

Adolescence is a critical period for young soccer players to develop physical and technical skills. During this stage, there is a significant transformation in running speed, endurance and physical strength. At the same time, cognitive development occurs through systematized physical training, leading to improvements in technical, tactical and psychological skills.[1] Adequate physical training and the acquisition of motor and psychological skills in this period are decisive for future progression within the sport because after adolescence, the selection process to play in the major leagues is even more rigorous.[2,3,4]

Soccer is a complex sport in which performance depends on an optimal combination of multiple indicators, such as physiological, technical, tactical and psychological characteristics.5 Speed and agility, for example, are important due to the large number of high-intensity sprints and changes in direction that occur during the game.6 Technical skills (dribbling, passing and kicking) are essential for performance because they allow the team to maintain possession of the ball and increase their chances of winning the match. Conversely, tactical skills are essential in high-level football because they allow motor and technical actions to be performed at the right time.[7,8,9,10,11]

Previous research has indicated that athletes selected by elite youth teams can be distinguished from athletes with inferior skills through a multitude of factors.[6,7,12] Generally, the players selected for elite teams have superior sports specificities, such as perceptual-cognitive ability, psychological skills, favorable anthropometric characteristics, and biological maturation. Of these factors, the most studied in relation to talent identification in male soccer are the date of birth, biological maturation, anthropometry and physical performance.[13] However, few studies have investigated multidimensional indicators in the same study.[2,9,14,15,16] For the process of training players and selection of sporting potential to be highly successful, it is important to evaluate current practices, so that adequate improvements can be made according to contemporary research.[2]

As soccer performance is multidimensional and rapid changes related to age occur during adolescence,3,8 the measurement of player development should also be multidimensional and longitudinal. Thus, the objective of this study was to evaluate the effect of a training season on the multidimensional indicators of the sporting potential of young soccer players, in relation to anthropometric, maturational, psychological, socioenvironmental, physical motor and technical-tactical aspects.

2. METHODS

2.1 Participants

The study included 18 adolescent male soccer players (age: 14.4±1.3 years, body mass: 59.2±9.0 kg and height: 170.5±9.3 cm) belonging to a Brazilian center for training young soccer players. Of the 18 athletes participating in the study, four belonged to the Under-14 category, four to the Under-15 category, five to the Under-16 category and five to the Under-17 category. The young soccer players trained three to five times a week, with matches on the weekends at state and municipal competitive levels. Data were collected twice, both times at the beginning of the training preseason, in March 2019 and February 2020.

The inclusion criteria were to train regularly and the informed consent form and the informed assent form duly signed. The exclusion criteria were nonperformance of the full battery of tests and presentation of injury and/or an acute disease that prevented them from performing the tests. The consent of the legal guardians and of the athletes were obtained prior to participation in the study.

2.2 Instruments and Procedures

On the first day, the players completed a questionnaire aiming to capture their personal data, assessment of psychological skills, sports experience, socioeconomic assessment and a self-report questionnaire assessing their level of physical activity. Next, the anthropometric variables were measured, and the flexibility test, handgrip strength and countermovement jump were performed. On the second day, declarative tactical knowledge, speed, agility and dribbling tests were performed at the usual training times.

Anthropometric indicators

For the anthropometric evaluation, body mass, height, sitting height, length of the lower limbs, arm span and skinfold thickness (triceps, subscapularis and leg) were measured according to the procedures described by Norton and Olds.[17]

Physical-motor indicators

Agility and ball handling in running with changes in direction were evaluated by the test proposed by Höner et al.[18] The volunteer, positioned behind a line, ran at maximum speed to a cone positioned in front of him when the evaluator gave the signal.

To evaluate flexibility, the sit-and-reach test proposed by Wells and Dilon was used.[19] The athlete removed his shoes and while in a seated position touched the feet in the box with the knees extended.

The explosive strength of the lower limbs was evaluated by the vertical countermovement jump (CMJ) test using the contact platform via *Multi-Sprint*® software, respecting the protocol proposed by Bosco et al.[20] The athlete placed his hands on his waist, trunk vertical and with legs extended, performed a knee semiflexion at 90° immediately followed by a vertical jump.

To evaluate generalized strength, the hand grip test, approved by the *American Society of Hand Therapists* (ASHT) and used by Fernandes and Marins, was used.[22] At the signal of the evaluator, the athlete gripped as strongly as possible for three seconds on the dynamometer without making arm movements.

The maximum speed was evaluated by the 20-meter speed test following the protocol described in the PROESP manual,[23] with the participant positioned behind a demarcation cone. At the signal of the evaluator, the player ran at maximum speed until the end point of the test.

Psychological indicators

The perception of sports competence was evaluated using the scale adapted from Sheldon and Eccles.[24] To quantity perceived competence, the sum of the responses was used, ranging from two to ten points, in which players were asked how they evaluate their soccer ability and how they compare themselves with other young people of the same age, scored on a five-point Likert scale 1: weak to 5: excellent.

To evaluate coping skills, the Brazilian version of the Athletic Coping Skills Inventory-28 (ACSI-28BR) was used.[25,26] According to the ACSI-28BR, which is composed of 28 items, seven coping skills were evaluated: coping with adversity, performance under pressure, goals/mental preparation, concentration, worry-free, confidence/motivation and trainability. All dimensions were evaluated on a four-point Likert scale, ranging from 0 (almost never) to 3 (almost always).

In this study, the version translated and validated for Brazilian athletes by Gallego et al.[27] to evaluate motivational orientation was used. The Sport Orientation Questionnaire (SOQ) consists of 25 items, which are answered on an ordinal scale as follows: A-completely agree (5 points), B-partly agree (4 points), C-indifferent (3 points), D-partially disagree (2 points) and E-completely disagree (1 point). The SOQ has three subscales of behavioral trends: competitive (13 items), determined (6 items) and winner (6 items).

Technical-tactical indicators

The Dribble test was used to evaluate technical ability using the same protocol as the agility test described above.[18] The athlete, standing upright behind a line, ran at maximum speed at the evaluator's signal, leading a ball to a cone positioned in front.

Tactical skills were evaluated by the Tactical Skills Inventory for Sports (TACSIS) questionnaire[28] by using the version translated and adapted to the Portuguese language in Brazil.[29] The TACSIS is composed of 22 items and has four subscales: positioning and deciding, knowing about ball actions, knowing about others and acting in changing situations, in addition to the sum of the scales. When evaluating their own performance in soccer, the respondent was instructed to compare themselves with the best players of the same age group, scoring the items on a six-point Likert scale, ranging from 1: very weak to 6: excellent or from 1: almost never to 6: always.

Socioenvironmental indicators

To evaluate family support, part of the Factorial Inventory of Parenting Practices Related to Talent Development in Sports was used, specifically Factor 1, Family Involvement with Child Sports Practice.[30] This test was used to evaluate family involvement in the child's sports practice, with ten questions scored on a four-point Likert scale, where 1 represents almost never and 4 represents almost always. The score of the instrument ranges from ten to 40 points.

The level of physical activity was assessed using the PAQ-C and PAQ-A Questionnaire, translated and adapted for Brazil by Guedes and Guedes.[31] The PAQ-C is composed of nine and the PAQ-A of eight questions, about sports, games, physical activities at school and leisure. Each question has a value of one to five points, with the final score being the average of the questions

Indicators of sporting potential

To evaluate sport potential, the coaches were asked to assign a subjective classification relative to the expectation of success that they place on each athlete in their category. The questionnaire called Intangible Checklist contains a list of ten qualities that characterize the athlete, in which the coach evaluates the player on a Likert scale, ranging from 1: weak to 5: excellent.[32]

Maturational indicators

Biological maturation was evaluated by indirect and noninvasive methods, considering the indicators of somatic maturation, namely, percentage of predicted adult stature[3] and age at peak height velocity (PHV), by calculating the maturity offset and distance in years that the individual reaches PHV.[33]

Training season

Among the activities mentioned in the table 1, in the conceptual game, athletes are subjected to stimuli aimed at developing an individual and collective understanding of general and specific game content, advocating the development of game concepts that apply in different situations. In contextual games, the goal is to prepare the team for the weekend game. In this type of game, the characteristics of the opponent are taken into account, and the activities are constructed to prepare the team to solve the problems created by the opponent or transform them to work against the opponent. The game of individual tactics allows the player to understand and successfully perform all the moves that his position demands, involving actions in moments with and without the ball, in which the player needs to know how to move and seek the best space. Finally, the situational analytic consists of dividing the technical gestures, performing them in specific situations of the game, and being able to manipulate several variables such as rules, touches, teammates, field position and stage of the game.[33]

Table 1. Activities developed during the season.

	Under-14	Under -15	Under -16/ Under -17
Monday		14:15 Introduction (Field) 14:25 FIFA 11+ (Field) 14:45 Individual tactic (Field) 15:15-16:00 Conceptual game (Field)	15:10 Introduction (Gym) 15:20 Strength training (Gym) 16:10-16:30 Individual tactic (Field) 16:30-17:00 Conceptual game (Field)
Tuesday	14:15 Introduction (Field) 14:20: FIFA 11+ (Field) 15:00: Conceptual game (Field) 15:30-16:00: Contextual game (Field)	14:15 Introduction (Gym) 14:20 Strength training (Gym) 15:10 Conceptual game (Field) 15:30 Contextual game (Field)	16:00 Introduction (Field) 16:10 FIFA 11+ (Gym) 16:30 Conceptual game (Field) 17:00-17:30 Contextual game (Field) 17:30-18:00 Situationalanalytic (Field)
Wednesday	14:00: Introduction (Gym) 14:15: Strength training (Gym) 14:45-15:30: Individual tactic (Field)	14:50 Introduction (Field) 15:00 FIFA 11+/Velocity (Gym) 15:30 Individual tactic (Field) 16:00-17:00 Contextual game (Field)	15:50 Introduction (Gym) 16:00 FIFA 11+/Velocity (Field) 16:20 Conceptual game (Field) 17:00-18:00 Contextual game (Field)
Thursday	14:10: Introduction (Gym) 14:15: Strength training (Gym) 15:15: Situationalanalytic (Field) 15:40-16:15: Conceptual game (Field)	14:10 Introduction (Gym) 14:15 Strength training (Gym) 15:15 Situationalanalytic (Field) 15:40-16:15 Conceptual game (Field)	15:20 Introduction (Gym) 15:30 Strength training (Gym) 16:20 Situationalanalytic (Field) 16:45-17:30 Conceptual game (Field)

Friday	15:00: Introduction (Field) 15:10: Psychological training (Field) 15:30: FIFA 11+ (Field) 15:50: Contextual game (Field) 16:10-16:30: Situational analytic (Field)	15:00 Introduction (Field) 15:10 Psychological training (Field) 15:30 FIFA 11+ (Field) 15:50 Contextual game (Field)	15:00 Introduction (Field) 15:10 Psychological training (Field) 15:30 FIFA 11+ (Field) 15:50 Contextual game (Field) 16:10-16:30 Situational analytic (Field)

Source: Prepared by authors (2022).

2.3 Statistical analysis

The descriptive analyses of the data are present as mean and standard deviation. Due to the small sample size, a univariate analysis of sporting potential indicators was chosen. The parametric assumptions of normality and equality of variances were evaluated by the Kolmogorov–Smirnov test and the Levene test, respectively. Differences between the pre-and post-season periods were analyzed by the Student's t-test for paired samples, with the amplitude of variation in the data calculated through the percentage delta. The effect size was evaluated by Cohen's d,[35,] and the following classification was adopted for interpretation: small: 0.20-0.49; moderate: 0.50-0.79; and high: ≥0.80. The statistical software IBM SPSS version 24.0 was used for all analyses, with a significance level of 5%.

3. RESULTS

Table 2 shows the general characteristics of the sample for the following variables: decimal age, semester of birth, time of practice, peak height velocity (PHV), maturity offset, predicted adult stature and maturity status.

Table 2. General characteristics of the sample (n = 18).

Indicators	Mean ± SD (Minimun – Maximum) n (%)
Decimal age (yearsold)	14.4 ± 1.3 (12.4 – 16.2)
Semester of birth (%)	
1º Semester	61.1%
2º Semester	38.9%
Time of practice (years)	7.4 ± 1.7 (3.6 – 10.1)
PHV age (years)	13.8 ± 0.7 (12.9 – 15.2)
Maturity offset (years)	1.0 ± 1.1 (-1.3 – 2.3)
Predictedadultstature (cm)	176.3 ± 5.7 (168.6 – 186.9)
Predictedadultstature (%)	96.4 ± 4.4 (87.5 – 101.7)
Maturity status (%)	
On-time	38.9%
Early	61.1%

SD: Standard deviation; PHV: Peak height velocity.

The anthropometric and physical-motor indicators of young soccer players before and after the training season are shown in Table 3.

Table 3. Anthropometric and physical-motor indicators of young soccer players before and after the training season.

Indicators	Pre (n=18)	Post (n=18)	Estimated difference between groups (95% CI)	p	ES
Anthropometrics					
Height (cm)	170.5 ± 9.4	173.4 ± 8.3	2.8 (1.4 – 4.3)	0.001*	0.33
Body mass (kg)	59.2 ± 9.0	63.1 ± 8.8	4.0 (2.8 – 5.1)	0.001*	0.47
Armspan a (cm)	174.7 ± 11.0	176.6 ± 9.8	1.9 (0.7 – 3.1)	0.005*	0.17
∑Skinfold (mm)	1.,3 ± 4.3	12.0 ± 3.8	1.3 (2.5 – 0.0)	0.046*	0.30
Body fatl (%)	10.8 ± 3.2	9.8 ± 2.8	0.9 (1.9 – 0.0)	0.046*	0.33
Physical-motor					
Handgrip strength (Kgf)	34.8 ± 9.3	41.3 ± 8.3	6.5 (4.7 – 8.5)	0.001*	0.77
Flexibility (cm)	24.6 ± 6.2	27.0 ± 5.4	2.4 (0.7 – 4.7)	0.04*	0.39
CMJ (cm)	34.2 ± 5.1	34.4 ± 4.5	0.2 (1.2 – 1.6)	0.78	0.04
Agility (s)	7.5 ± 0.4	7.8 ± 0.5	0.47 (1.7 – 0.8)	0.005*	1.09
10 m sprint (s)	1.6 ± 0.2	1.7 ± 0.2	0.1 (0.1 – 0.3)	0.21	0.50
20 m sprint (s)	3.1 ± 0.2	3.2 ± 0.1	0.1 (0.0 – 0.1)	0.05*	0.35

Pre: before the training season; Post: after the training season; 95% CI = 95% confidence interval;

* $p < 0.05$, significant difference between pre and post; ES: effect size; CMJ: countermovement jump.

Table 4 shows the psychological indicators of young soccer players before and after a training season.

Table 4. Psychological indicators of young soccer players before and after the training season.

Indicators	Pre (n=18)	Post (n=18)	Estimated difference between groups (95% CI)	p	ES
Perceivedcompetence (pts)	7.5 ± 1.4	7.4 ± 1.2	0.1 (0.8 – 0.6)	0.73	0.08
Psychological Skills					
Coping withadversity (pts)	1.9 ± 0.7	2.0 ± 0.9	0.1 (0.3 – 0.5)	0.56	0.16
Peakingunderpressure (pts)	2.0 ± 0.6	2.0 ± 0.7	0.1 (0.4 – 0.5)	0.79	0.09
Mental preparation (pts)	1.7 ± 0.5	2.0 ± 0.8	0.3 (0.6 – 0.0)	0.046*	0.63
Concentration (pts)	1.9 ± 0.6	2.2 ± 0.6	0.3 (0.6 – 0.6)	0.10	0.42
Freedomfromworry (pts)	1.2 ± 0.8	1.4 ± 0.8	0.1 (0.1 – 0.4)	0.38	0.13
Confidence/Motivation (pts)	2.1 ± 0.6	2.6 ± 0.6	0.5 (0.7 – 0.2)	0.002*	0.82
Coachability e (pts)	2.6 ± 0.5	2.7 ± 0.5	0.2 (0.1 -0.4)	0.17	0.38
∑ of Scales (pts)	13.4 ± 2.6	14.8 ± 2.9	1.5 (2.6 – 0.3)	0.01*	0.57
MotivationalOrientation					
Competitive (pts)	4.5 ± 0.4	4.7 ± 0.2	0.2 (0.4 – 0.0)	0.05	0.54
Winner (pts)	4.4 ± 0.7	4.6 ± 0.3	0.1 (0.2 – 0.5)	0.43	0.20
Determined (pts)	4.4 ± 0.6	4.5 ± 0.5	0.1 (0.2 – 0.5)	0.37	0.25

Pre: before the training season; Post: after the training season; 95% CI = 95% confidence interval;

* $p < 0.05$, significant difference between pre and post; ES: effect size; pts: points.

The technical-tactical, socioenvironmental and sporting potential indicators after a training season are shown in Table 5.

Table 5. Technical-tactical, socioenvironmental and sporting potential indicators after a training season

Indicators	Pre (n=18)	Post (n=18)	Estimated difference between groups (95% CI)	p	ES
Technical-tactical					
Dribbling speed (s)	10.6 ± 0.8	10.6 ± 0.6	0.0 (0.3 – 0.3)	0.77	0.05
Δ Dribbling speed (s)	3.1 ± 0.7	2.7 ± 0.5	0.4 (0.8 – 0.1)	0.019*	0.64
Positioninganddeciding (pts)	4.3 ± 1.0	4.5 ± 0.9	0.3 (0.2 – 0.7)	0.22	0.25
Knowing About Ball Actions (pts)	4.2 ± 0.9	4.9 ± 0.6	0.8 (0.5 – 1.1)	0.001*	0.93
KnowingAboutOthers (pts)	3.9 ± 0.9	4.2 ± 0.8	0.3 (0.1 – 0.7)	0.08	0.40
Acting in Changing Situations (pts)	4.4 ± 0.9	4.7 ± 1.0	0.3 (0.3 – 0.8)	0.31	0.29
∑ of Scales (pts)	4.2 ± 0.8	4.6 ± 0.6	0.4 (0.1 – 0.7)	0.006*	0.56
Socioenvironmental					
Family support (pts)	30.7 ± 5.9	32.1 ± 3.5	1.4 (1.0 – 3.9)	0.23	0.29
Physicalactivitylevel (pts)	2.6 ± 0.7	2.8 ± 0.5	0.2 (0.2 – 0.6)	0.27	0.33
Sporting potential					
Intangible checklist (pts)	33.1 ± 8.4	36.1 ± 5.8	3.0 (0.8 – 6.7)	0.11	0.42
Performance in the future (pts)	3.3 ± 0.8	3.7 ± 0.8	0.3 (0.1 – 0.8)	0.11	0.48

Pre: before the training season; Post: after the training season; 95% CI = 95% confidence interval;

* $p < 0.05$, significant difference between pre and post; ES: effect size; pts: points.

4. DISCUSSION

The main results of the present study indicate that a training season promotes significant improvements in multidimensional indicators of the sporting potential of young soccer players. Together, these results illustrate the multidimensional dimension of the potential development processes in soccer.

It is essential to monitor anthropometric evolution in young soccer players, especially in a period of major transformations in body structures. Periodic monitoring is important to record the trend in the evolution of the young athlete's body.[36] In addition, it is possible to establish an efficient

anthropometric profile for their position in soccer, thus facilitating the discovery of talent or even the monitoring of the effect of training over the years on the athlete's development.

In the present study, after one training season, an increase in the anthropometric indicators of height (Δ=1.7%), body mass (Δ=6.6%) and arm span (Δ=1.1%) was found, and a decrease in the sum of skinfolds (Δ=-9.7%) and body fat percentage (Δ=-9.3%). These findings corroborate the results of Forsman, H. et al.[14], who found that Finnish players grew by an average of 7.1 centimeters in one year of training, indicating that some players may have reached the age of peak growth velocity and others had not. However, compared to a four-year segment study, Deprez et al.[16] observed an average increase in height of 16% for 42 players aged between 11 and 16 years in Belgium.

The batteries of physical-motor tests can and should serve as guidance of the level that the child presents on a given physical quality. Values well below the average suggest a problem that should be evaluated in more detail, and solutions should be sought by professionals, encouraging this young person to develop physically. On the other hand, excellent performance in certain physical qualities represents a basic condition for sports performance in many sports.[35]

Thus, the present study conducted a battery of tests, including at least one test for each physical quality considered essential in soccer. After one training season, a significant increase in handgrip strength (Δ=18.7%), flexibility (Δ=9.8%), countermovement jump power (Δ=3.7%), agility (Δ=4%) and 20-meter sprint (Δ=3.2%) was observed. These results corroborate the findings of Fransen, J. et al.[39], who linearly modeled the periods of development of motor competence and physical fitness for six years in a large sample (n=2228) of players from the Belgian elite, aged between five and 20 years. The average results per year were as follows: an increase in 1.52 cm for flexibility, an increase in handgrip strength of 4.76 kgf, an improvement on the agility test of 0.19 seconds, an improvement in the 20-meter speed test of 0.11 seconds and an improvement in the power of the lower limbs of 9.35 cm.

In contrast to this study, Los Arcos and Javier Martins[40] evaluated changes in the physical fitness performance of young elite Spanish players (n=97), comparing those who became professionals (n=38), playing at least two seasons in the adult team after leaving the base categories, and those who did not reach the professional level (n=59), between 1996 and 2013. When comparing values of the countermovement jump, 15-meter speed test and submaximal running test, no statistically significant difference was found for these physical indicators between professional players and those who did not make the adult team. In addition, the physical performance of the sample that turned professional in the last year of basic training was similar to the two following seasons in professional soccer. The authors attribute these results to two main reasons: first, the battery of tests was performed in the last year of gym training, a time when players' physical performance was already nearing its peak. Accordingly, second, the weekly training load was not

evaluated during the training periodization, which may be why there was an overload during data collection, especially in the competitive period.

In the early stages of training of young soccer players, it is important to know the reasons that lead the child to practice the sport, their perception of competence and their potential to deal with stress and the demands of soccer. At this stage, the use of instruments to evaluate the psychological characteristics of athletes has a formative function, directly linked to the training and development of young athletes, since they allow the identification of strengths and weaknesses in their profile that can be addressed by sports professionals through specific interventions

Stress is one factor that is present at all times, before, during and after the soccer match; therefore, the player must cope with this aspect through various psychological strategies that enable him to manage it to succeed in his sports career.[41] Thus, with regard to psychological indicators, after one training season, the present study found significant improvement for the following variables: mental preparation (Δ=17.6%); confidence/motivation (Δ=23.8%) and scale sum (Δ=10.4). These results indicate that from one season to the next, the players became more motivated and confident, regarding both factors related to the athlete's personality, interests, needs and goals and extrinsic factors such as challenges, training, structure and social relationships, thus improving their capacities to deal with and manage sports stress.

In contrast to these findings, Forsman et al.[14] evaluated 288 Finnish soccer players aged between 12 and 14 years. When comparing indicators of perceived competence and motivation after one year of training, these variables remained stable. The authors attribute the lack of improvement in psychological indicators to the fact that these players are already highly competitive and skilled, representing the best players in the country for this age group. Positive associations were found between levels of perceived competence and motivation with physical-motor indicators of speed and agility, suggesting that players who perceived themselves to be better at soccer practice and more motivated were also the faster and more agile players on their teams.

Particularly in soccer, the technical-tactical components stand out, as both enable "what to do" (tactics/cognitive processes based on knowledge, which lead to the mental generation of options and decision-making) and "how to do it" (technique/motor performance, implementation of the decision based on the quality of the technical-coordinative level). Such components are treated as performance indicators in training and competition, in the same way that the previously discussed indicators of physical, anthropometric, socioenvironmental and psychological conditions are strongly interrelated.[35]

When analyzing the technical indicators after a training season, the present study found a significant improvement in the Δ dribbling speed (Δ=12.9%). This result was higher than that found by Forsman et al.[14], who observed stability of this variable after one year of training in young Finnish

players aged between 12 and 14 years (n=288). The authors emphasized that these players represent the country's elite and that the baseline values for the dribble variable were already very high.

Valente dos Santos et al.[9] observed a significant improvement in dribbling performance and other technical skills when accompanying young elite Portuguese players (n=83) for five seasons, from 11 to 17 years. The authors detected a marked improvement in the functional skills of soccer between 13 and 15 years of age, especially in players who acted as midfielders. They attribute this finding to the specialization of midfielders that occurs earlier in the training process than defenders and attackers. When performing multilevel modeling in this sample, the authors observed positive correlations between anthropometric, maturational, physical-motor and technical skills indicators, showing associations with sports orientation in different age groups.

In terms of tactical skills, the present study found a significant improvement in the variables related to knowing about ball actions (Δ=16.7%) and the sum of the four TACSIS subscales (Δ=9.5%). These results indicate that the players improved their decision-making to solve problems in the game, with and without the ball, knowing better what to do and how to do it and explaining their decision based on knowledge of the soccer game learned during training. These findings corroborate the findings of Huijgen et al.[42], Kannakens et al.[43] and Elferink-Gemser et al.[42], which indicate that high-potential soccer players have better tactical skills than low-potential soccer players. Huijgen et al.[42] examined the performance characteristics that differentiate selected and unselected young soccer players in talent development programs ranging from 16 to 18 years of age. Regarding tactical skills, the subscale "positioning and deciding" is a factor that significantly differentiates selected and unselected young soccer players.

Considering these findings, Kannakens et al.[7] evaluated the tactical skills of young elite soccer players and a posteriori compared soccer players who reached the level of professional performance in adulthood and those who remained amateurs. The results indicated that the subscale "positioning and deciding" is the factor that best predicts performance in adulthood, with mean scores of 3.76 for amateurs and 4.00 for professionals, with a moderate effect size. Notably, half of this sample of players did not reach the professional category in subsequent years, suggesting that to reach the level of professional performance in adulthood, it is important to score at least as "good" in the "positioning and deciding" subscale (low: 1.00–3.50; moderate: 3.51–4.00; high 4.01–6.00), i.e., achieving scores equal to or greater than 4.01.

5. LIMITATION

A limitation of the present study is the lack of retesting for the analyzed variables. The number of players in the sample was well reduced, and the effect of maturation was not controlled. In addition, although the present study uses a period of one season for the analyses, thus

constituting a longitudinal study, 11 months can be a relatively short time in the development of an athlete, which may be one reason for the lack of a statistically significant difference for some variables.

6. CONCLUSION

A training season promotes significant improvements in multidimensional indicators of young soccer players' sporting potential. Together, the results of this study illustrate the multidimensional dimension of the talent development processes in soccer. From a practical point of view, this information can support technical commissions in cultivating the multifactorial competencies of young soccer players.

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