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MINI-REVIEW

Periods of Competitive Break in Soccer: Implications on Individual and Collective Performance

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Abstract:

Competitive breaks in soccer have been revealed to be detrimental to the individual and collective performance of soccer players and teams. Several studies have been carried out, and the evidence suggests the need to apply specific training programs to avoid a decline in soccer players' performance. However, the elaboration of these specific programs, in many cases, is essentially focused on physical performance, neglecting the technical and behavioral domain.

In this small review, the competitive breaks and their main effects for detraining were critically analyzed. Concurrently, we analyzed the effects of the use of specific training programs to avoid changes in the performance of soccer players and teams.

It is essential to create guidelines for coaches to apply for specific training programs properly during competitive breaks so that soccer players can maintain their individual and collective performance, considering the physiological, technical, and behavioral domains. Applying of these programs will also contribute to enhancing soccer players' physical condition, increasing their tolerance to the imposed training loads, and, consequently, reducing the appearance of injuries.

Keywords: Detraining, Season, Off-season, Transition period, Training program, Training load, Technical, Physiological, Physical.

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1. INTRODUCTION

1.1. Problem Definition

Soccer is a collective sport with complex and dynamic characteristics, in which the schedule of events becomes a determining factor in the planning process [1]. Usually, for the planning process, the season is usually divided into three different periods: pre-competitive, competitive, and transition [2], with each moment duration being influenced by intrinsic (*i.e.*, environmental conditions) and/or extrinsic factors (*i.e.*, international competitions) [2]. Throughout these periods, it is known that there can be numerous competitive breaks resulting from different factors, such as diseases, vacations, injuries and breaks for international competitions [3]. These breaks have different characteristics and duration and can happen during the competition or outside the competitive period (*i.e.*, transition period) [2]. While during the competitive period breaks tend to not occur for more than 2 weeks [4], when it appears outside the competitive period it is linked to the resting periods between competitive seasons and usually lasts between 4 to 6 weeks [2, 4].

Competitive breaks are characterized by a detraining period, which consists of a reduction or complete cessation of physical activity [5], which can compromise the athlete's physiological adaptations and performance [2, 6 - 8]. These periods are classified as short if the period is less than 4 weeks, and long if its duration is longer than this [2, 4, 9], and can negatively affect the different physiological systems (*i.e.*, cardiovascular, respiratory, neuromuscular and musculoskeletal), as well as physical capacities (*i.e.*, strength, endurance, sprint, speed and flexibility) of soccer players [8, 10].

Currently, the individual performance of soccer players is influenced by different factors, such as: psychological, physical, technical, tactical and social support (evidencia). These are required to perform high-intensity efforts, and for this reason, the systems and capacities mentioned above must be

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continuously enhanced aiming at increasing their physical condition [11, 12] essential to enhance performance in technical, tactical and behavioral domains [13].

The reduction in training stimuli as a result of competitive breaks intensifies the athlete's metabolic rate decrease, which has a high impact on his performance [10, 14], contributing to changes in maximal oxygen consumption (VO_2 max) [9, 10, 15, 16], strength capacity [3, 10, 11], sprint ability [7, 9, 11, 17], agility [2, 9] and in the soccer players's body composition [3, 18, 19]. In addition, previous studies have also reported a decrease in creatine concentrations, cortisol and testosterone levels [2, 20] as a consequence of reduced training stimuli.

During periods of reduced or interrupted activity, soccer players are generally subjected to training programs that essentially aim to reduce losses on their levels of training and performance [5, 21]. Previous research [5, 11, 15, 17 - 19, 21, 22] has shown that the application of training programs during these critical periods should be seen as an effective strategy to minimize the potential effects of detraining, since they allow soccer players to maintain their physical condition, contributing to improved performance and tolerance to high training loads, and significantly reducing the appearance of injuries [2, 18, 19, 23]. In contrast, other investigations on the topic [14, 22, 24] found that the application of these training programs does not seem to be beneficial for the athlete's performance, defending the importance of resting during periods of competitive absence.

A recent investigation [25] on the subject, in which harmful effects on the body composition and physical fitness of soccer players were observed after interrupting the training process, suggests the need to understand the effects of different training programs applied during detraining periods on the individual performance of the athlete throughout the season.

The individual technical and tactical performance of the soccer player appears to be a fundamental variable for success, and over the years, there has been an evolution in this ability that has resulted in more capable and technically evolved soccer players [26]. This record at the technical level arises as a result of the tactical/behavioral evolution of the game, in which technically evolved footballers are also able to better capture the information intrinsic to the strategic-tactical aspects of the game. Thus, the technical versatility of the footballer, such as speed and quality of execution, appears to be an important characteristic in athletes of high level performance, presenting fundamental implications in the tactical dimension of the game [27]. This game, characterized by the interaction and cooperation between footballers of the same team, requires an understanding of the coordination processes between them [28]. Research indicates that the training programs developed and applied for the maintenance/optimization of performance [5, 11, 15, 17 - 19, 21, 22] only focus on the individual physical/physiological performance of each footballer, neglecting the collective behavior. As such, it is necessary to address the complexity and collective dynamics in order to assess strategic decisions and tactical behavior [29], which is conditioned by the behavioral performance of each soccer player in their action on the field [28].

To the best of our knowledge, the studies carried out and the applied training programs [3, 5, 11, 15, 17 - 19, 21, 22] focus their attention only on physical and physiological aspects of performance of soccer players. Therefore, studies carried out and previously addressed present a common scientific standard, limiting the obtained results, since the sample of the studies was composed mostly of adult soccer players [9, 11, 12, 15, 18, 19, 21, 30 - 32], neglecting the analysis of the effects on young soccer players, making it necessary to clarify detraining and its consequences in younger age groups [25, 33]. Regarding the players´ gender, these studies mainly focus on male soccer players [5, 9, 11, 12, 15, 18, 19, 21, 32], most of whom are professional [12, 15, 18, 19, 32] and semi-professionals players´ [5, 9, 11, 21]. Regarding the detraining period, the evidence essentially focuses on the interruption between two competitive seasons [9, 11, 12, 15, 18, 19, 21, 32], with a small number of studies that specifically analyze the breaks that occurred during the competitive period, (*i.e.*, breaks due to international competitions) [4]. It is also verified that the previous studies neglected the consequences on the tactical and technical behavior during these periods, since the individual behavior of the athlete, during a game, is the effect of the interaction with the different domains (physical, tactical and technical) [26, 28, 31]. Considering what was previously mentioned, further studies are needed to clarify the phenomenon of detraining, also analyzing tactical and technical variables, at different competitive levels, among footballers of different age groups and considering different break periods [25].

A review seems necessary to form a summary of the findings and new evidence on the effects of detraining as a consequence of competitive break, taking into account the different domains that interfere in the performance (*i.e.*, physical/physiological, behavioral and technical). Additionally, it is important to establish and define methodological guidelines that standardize the prescription and development of specific training programs for soccer players during periods of competitive absence and that present an ecological approach [33], enhancing the performance of soccer players and avoiding the appearance of injuries.

In order to find relevant publications and ensure the quality of the articles, the following databases were used: Web of Science (the modules "Core" and "Medline"), Scopus and PubMed. Articles published in 2021 or earlier and written in English were considered. The search strategy comprised search terms that combined one of two primary keywords ("soccer" or "football") with a second keyword ("detraining" or "training programme") and a third keyword ("off-season", "in-season", "season", "transition period"), using the Boolean operator. The inclusion criteria for these articles were: (1) relevant data on: physical performance, training method, technical performance and tactical behavior; (2) the participants included amateur and/or professional and/or semi-professional male and female soccer players; and (3), the articles were published in English. Studies were excluded if: (1) they did not include data relevant to this study; and (2), were conference abstracts. The articles were screened based on an assessment of both the title and the abstract. All articles that did not focus on the investigation were excluded. In total, 84 articles were considered relevant for

this review. These articles were read in detail by two senior researchers with substantial experience in the field (including relevant publications) and assessed for relevance and quality. Articles that did not meet the criteria were excluded. After this procedure, 47 articles remained (Fig. **1**).

2. SUMMARY OF PREVIOUS RESEARCH

2.1. Performance in Soccer

Soccer is a high-intensity intermittent sport [26], increasingly requiring soccer players to possess high levels of physical and fitness conditions related to the ability to perform a set of powerful actions such as running, jumping, changing direction, among others [34]. Combined with these skills, it is also essential that soccer players have excellent technical performances due to the evolution that the game has undergone over the years [26]. Thus, for efficient performance, soccer players need to develop these different competencies at their limit, however, due to the complexity of the game, it becomes difficult to quantify [35].

Soccer is an activity with predominance in aerobic capacity, but in which soccer players depend on anaerobic and explosive efforts [36]. Soccer players need to develop their aerobic capacity sufficiently to support the demands imposed by the game, and this component is an important factor in determining the competitive level [15, 16, 21]. The development of aerobic capacity enhances an increase in the physical performance of the soccer player due to increased recovery capacity and greater tolerance to fatigue [34].

Although there is a greater predominance of aerobic capacity in the soccer player's distribution of energy during a game, the decisive actions are largely dominated by anaerobic metabolism [34, 37].

Anaerobic variables are sensitive in different periods throughout the season [30]. In fact, over the years, soccer players have been increasing sprint performance, muscle strength and jumping ability [2, 11, 38], largely due to structural changes in the game, which led to an increase in requests imposed on soccer players [26]. Corroborating this idea, a previous study [26] reported an increase in the number of such requests throughout the game, requiring soccer players to have high anaerobic capacity in order to be able to perform more high-intensity sprints and reach higher speeds [26]. Thus, bearing in mind that anaerobic capacity is sensitive to variations, it is essential that training programs take this into account.

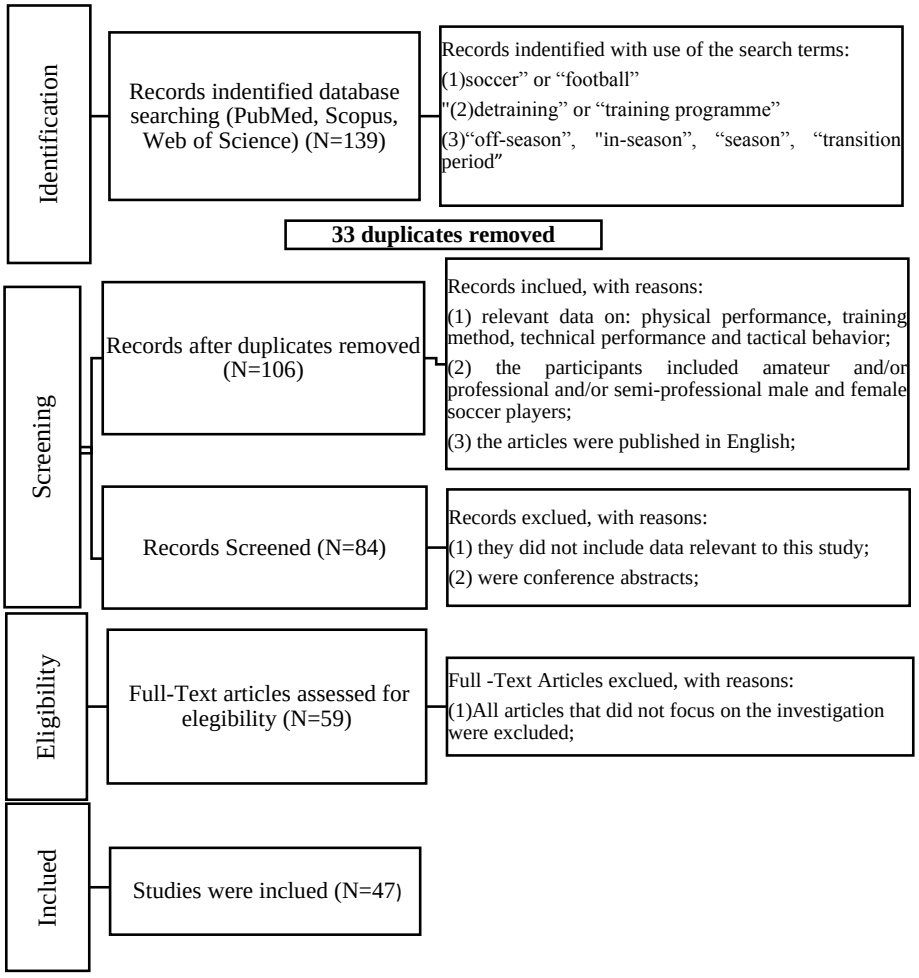

Fig. (1). PRISMA 2009 flow diagram.

Finally, flexibility is fundamental to the performance of the soccer players since it allows them to maintain the range of movements to be performed during a game and thus to be effective in their technical and tactical actions [8]. This ability enables soccer players to effectively apply their individual technical skills and consequently increase the muscles' mechanical capacity, preventing injuries and enhancing their actions in the game [37, 38].

Previous investigations based on the study of detraining periods or reduction of training in soccer, before and during the season, have shown that these periods efficiently compromise the athlete's physical performance and can affect individual performance [6, 7, 14]. The detraining as a consequence of an absence of training stimuli at a certain moment characterizes the after-break preparation period as having a high training load in a reduced period of time, causing fatigue and a catabolic environment in the athlete's function of the neuro-muscular system [2, 9, 14, 15]. This catabolic environment causes a decrease in soccer players' muscle strength, speed and power [14]. In addition to changes in individual performance, the absence of training and competition stimuli promotes a significant increase to the risk of injury [39 - 41], which translates into a greater risk of overtraining at the end of the season [14]. In long detraining periods, there is a significant decrease in the morphological and physiological abilities of soccer players, such as anaerobic capacity [2, 5, 11, 17], aerobic fitness, performance in intermittent running [2, 15, 17, 18, 40, 42], running performance and body composition [2, 9, 19, 43].

2.2. Aerobic Fitness

Observing the detraining effects in the soccer players' physiological and physical capabilities, it appears that as for the aerobic capacity, there is an effective decrease in the cardiorespiratory performance and intermittent runs [2, 15, 17 - 19, 42]. Other studies [15, 18] point out that the losses are significant, since the period of inactivity, in the short and long term, can result in a reduction in the VO_2max level of 4% to 14%, while others [17, 42] emphasize that inactivity slows down the VO_2max kinetics, causing a 21% decrease in cardiorespiratory performance after the detraining period.

2.3. Anaerobic Capacity

Considering soccer as an intermittent sport that appeals to different energy systems, anaerobic capacity is essential to improve performance and in the rehabilitation and injury prevention of the soccer player. It was found that during the detraining period, soccer players showed a decrease in jumping capacity and sprint performance resulting from the loss of muscle strength [2, 5, 11, 32, 44]. The characteristics of the game encourage the soccer players to make short and intense efforts such as sprints, with and without changes of direction, accelerations and decelerations, shoots, jumps, among other actions that generate strength and are fundamental in soccer performance [44].

2.4. Sprint Performance

Regarding sprint capacity, it is reported that a short competitive break causes a decrease in the performance of soccer players [2, 5, 11], with a moderate decline in sprint capacity. In turn, another study [11] concluded that the detraining period, in the short term and after competition, resulted in a considerable decrease in soccer players' sprint performance.

2.5. Flexibility of Soccer Players

Flexibility has also been shown to be essential in the performance of soccer players since this ability is responsible for maintaining the joints' range of motion, allowing athletes to be effective in the movements they develop throughout the game [38]. In some studies [8, 9], a decline in the performance of this skill has been reported after 8 weeks of detraining, showing that performing stretches in a training program will enhance the flexibility of soccer players, allowing an improvement of the athlete's technique and increasing the mechanical capacity of muscles and joints, thus contributing to the development of agility, speed, and strength [38].

2.6. Body Composition

Regarding body composition, previous reports [18, 19] found that it interfered significantly with the athlete's performance, in which soccer players with a high percentage of fat mass had difficulty in responding to the demands of the game. A recent investigation [18] concluded that throughout the season soccer players maintained their body composition, however, during the detraining period, there was an increase in fat mass in their constitution. Other studies [7, 15, 19] found that detraining periods that occur between two competitive seasons enhance the decrease in the percentage of fat-free mass in soccer players, thus emphasizing the need to formulate adequate training programs. In summary, it was found that there are considerable reductions in the performance of soccer players regarding different physical and physiological capabilities, after a detraining period, making it essential to find mechanisms and tools with practical use to suppress this negative impact. Based on previous reports, it is suggested that training programs are applied to soccer players [2, 3, 9, 11, 15, 18, 19, 21] as a strategy to maintain or mitigate the deterioration of the athlete's performance throughout the detraining periods [2, 18, 19], and these must be differentiated according to the purpose for which they are developed and applied.

2.7. Training Programs

There are training programs with a reconstructive character and maintenance of the athlete's abilities [2, 15], while others have been oriented towards increasing physical and physiological capacities throughout the competitive season, which translates into a reduction in the intrinsic pressure in preparation for the competitive season [9, 11]. In addition, some reports demonstrate that all soccer players should participate in a maintenance training program that combines all the variables of the physical condition [9].

2.8. Application of Training Programs

The application of specific training programs in periods of

competitive break allows an increase in the physical condition throughout the competitive season as well as the maintenance of physical capacities until the competitive recovery [9]. Several authors [2, 11, 15, 21] have been studying the effectiveness of applying a training program to soccer players in order to reduce the effects of detraining on performance since this period is detrimental to their performance, resulting in a significant reduction in aerobic performance, anaerobic fitness, speed, flexibility, and percentage of fat-free mass.

In one of the investigations carried out on the subject [2], the authors state that the training programs to be applied in the transition period between two competitive seasons should focus on maintaining or attenuating the deterioration of the soccer player's performance. This investigation [2] points out that the programs are characterized by having clear objectives, low frequency and simplicity, demonstrating that the detraining period caused a decline in the soccer player's sprint capacity, muscle strength, aerobic capacity and body composition. Other studies [15, 21] propose that this training program should occur twice a week with 48 - 72 h breaks. In fact, the authors suggest that one of the weekly sessions should be composed of high-intensity training (5x4 min at 87-97% HR max) and the other session composed of muscular strength and resistance development tasks [15, 21].

In another study [11], the effect of the detraining period over a period of 5 weeks was evaluated, and in the first two weeks, two groups were assessed: one at complete rest and the other performing a high-intensity aerobic training program with a 3 times weekly frequency. The experimental group maintained its performance at the level of aerobic capacity (VO_2 max), while the control group reduced its performance, with no changes in body composition and agility between the groups.

In order to understand the effects of detraining on aerobic capacity and body composition in soccer players [15], a training program was applied for 4 weeks, consisting of aerobic and strength exercises. The results showed considerable losses in aerobic capacity (VO_2 max) and an increase in the % of fat mass in soccer players who did not carry out the program.

Another investigation [9] in which a test with the practical application was performed concluded that in the detraining period between two competitive seasons, there was a decrease in physical condition in soccer players, particularly in relation to sprint and agility. The researchers recommend the application of a light training program, consisting mainly of maintenance tasks and with a frequency of 2 to 3 times a week.

These data emphasize the importance of proper planning of a training program at the end of the competitive season. This conclusion is in line with what was previously reported [18], where it was evidenced that the application of this type of training program must occur for 4 weeks with moderate training load in order for the soccer players to recover the aerobic capacity and body composition. Moreover, in relation to body composition, another study [19] emphasizes that the application of individualized and high-intensity training programs, lasting 3 weeks with a weekly frequency of 4 times, is effective in reducing the athlete's fat mass.

In another study on the subject [41] that evaluated the effects of an intensive training program consisting of high-intensity aerobic activities (8x2 min) and resistance speed tasks (10-12x30 seconds) with a complete training interruption, it was observed that soccer players who did not participate in the intensive training showed delayed inertia of VO_2 max associated with reduced muscle oxidative capacity.

Not all investigations carried out indicate benefits resulting from the application of a specific training program to minimize the effects of detraining. Evidence shows that after the application of a reduced training program [22], consisting of moderate running and plyometric training, lasting 21 days and with a biweekly frequency, it was found that soccer players who did not participate in the program showed no differences in sprint and plyometric performance when compared to soccer players who completed the training program.

The contradictions presented in different studies [9, 15, 18, 19, 22, 40] lead the researchers of the present study to conclude that considering the same aim, there are different training program methodologies, with variations in intensity, duration, frequency and typology. Therefore, it is not surprising that some authors [2, 9, 18] argue that regarding intensity, training programs should be simple, focusing on low volume and maintenance, while others [11, 15, 19, 40, 42] state that they must be composed of high-intensity tasks, with an improvement in mechanical efficiency performance in repeated sprints and aerobic capacity [11, 15]. Regarding the duration of the training programs, there is evidence reinforcing that their occurrence must have a minimum durability of 3 weeks [19], while others recommend at least 4 weeks [15, 18, 22], emphasizing the importance of applying for the training program throughout the detraining period [2, 11]. In fact, the present study researchers observe that there is no consensus among the various evidences [2, 9, 11, 15, 18, 19, 21, 22, 42] on the frequency that the program should have. Previous research [2, 9, 11, 19, 21] suggested that the recommended weekly frequency should be 2 to 3 times a week, while others [19] consider that the programs should be applied 4 times per week [19] and 6 times per week [15].

The period the program should be applied also raises some controversy in the scientific community, given that several authors [15, 17 - 19] suggest that the application of the training program should only happen after an initial period of complete detraining, while others [2, 11] reinforce that the program must occur throughout the period of competitive break and cessation of activity. This data highlight the need to go deeper into the potential impact of a training program during periods of detraining. In addition, the typology and characterization of this type of programs are also not fully understood and therefore, more research is needed regarding this topic.

3. CONTRADICTIONS AND PROBLEMS

Competitive breaks in soccer players cause several changes that arise as a result of the training associated with these períods. However, it was found that the different studies carried out on the theme focused essentially on physical and physiological variables (*i.e.*, aerobic capacity, anaerobic fitness, speed, strength, flexibility, body composition and

flexibility) [2, 5, 11, 15, 17 - 19, 21, 22]. The absence of research reporting behavioral and technical variables makes it difficult to analyze the effects of detraining with regard to individual and collective behavioral interactions.

In the studies previously mentioned, the effects of a detraining period were analyzed based on the evaluation of different physical and physiological capacities associated with aerobic capacity [2, 15, 17 - 19, 42], anaerobic capacity [2, 5, 11, 32, 44], speed [41], flexibility [8, 9] and body composition [15, 18]. Considering that soccer is a game of interaction and collective involvement, in which the performance depends on a set of interactions between the variables, it is essential to perceive and investigate how the techniques and behavioral variables influence the individual and collective performance [2].

In the same way, there are also just a few studies [5, 14, 33] that analyze competitive breaks in young soccer players [25, 33]. It was found [3, 5] that competitive breaks in training levels induce decreased aerobic capacity, strength, neuromuscular performance and body composition in young soccer players. As a result of the application of a training program [45] in young soccer players aged 12-13 years, consisting essentially of plyometric exercises and with a weekly frequency of 3 times a week for 10 weeks, it was found that their performance was not affected compared to others who did not follow the training program, regarding countermovement jump, squat jump, drop jump, multiple 5 bounds and repeated rebound jump for 15 seconds. As such, the consequences of a detraining period in young soccer players are not clear in the literature, and other issues need to be investigated [3].

Most studies on the consequences of the detraining period focus on the transition period, which runs between the end and the beginning of the competitive season. To our best knowledge, only one study analyzed a competitive break over the competitive season [4]. This study revealed that the detraining period caused by the competitive pause during the Christmas period induced a decrease in the ability to perform repeated sprints by soccer players, both in professionals as in young people, with no decrease in performance regarding intermittent aerobic resistance. However, only changes in the performance of soccer players with regard to cardiorespiratory endurance and repeated sprints were evaluated, and no training program was prescribed in order to minimize the impact of the detraining period.

The conclusions between the different studies [2, 5, 9, 11, 15, 18, 19, 22] regarding the application of a training program during the period of competitive interregnum are divergent. The existing scientific evidence does not demonstrate which training program is the most effective to be applied during the period between competitive seasons or on breaks throughout the season. The proposals for specialized training programs for the detraining periods present different methodologies, typologies, objectives and duration, with some scientific differences previously presented. Studies carried out [2, 9, 18] reveal that the training program must have a reconstructive and maintenance character, being composed in its nature by tasks of moderate load. In turn, others [5, 11, 19, 22] remark that the training program should be of high-intensity (HIT), based on strength exercises and aerobic exercises. It is essential to recognize that in both programs positive results are reported in soccer players despite using totally different methodologies, emphasizing the need to further investigate this subject in order to clarify this evidence.

As for the duration of the training programs, there is also a lack of consensus, as some authors consider that they should be applied throughout the detraining period [2, 9, 15], and others suggest that it should not be applied throughout the entire detraining period [5, 11, 18, 19]. This argument is supported by the fact that soccer players must have a resting period before the application of the training program, thus avoiding catabolic and fatigue states [17 - 19].

Regarding the frequency of the training program, different methodologies were found, in which some authors [2, 5, 9, 11, 22] refer that the application of the training program should take place 2 to 3 times a week and others [15, 19] indicate that this should occur with higher weekly frequency. Thus, in relation to the frequency of the training, divergent scientific evidence emerges as well, making it difficult to understand which is the most effective method.

Other studies [14, 22, 24] question the relevance and usefulness of these training programs, defending the importance of resting in these periods. For them, soccer players at the beginning of a new season have low levels of test-osterone and high levels of cortisol and as such they may experience performance reductions throughout the season, concluding that the absence of resting enhances a catabolic environment for the neuromuscular system [14]. This position is reinforced by the evidence [24] that after a period of rest, without the application of a training program, soccer players showed improvements regarding cardiorespiratory fitness and strength.

Taking into account the various divergences, contradictions and stated results, it is essential to develop further studies to assess the phenomenon of detraining as a whole [25]. Future investigations must focus on assessing the interaction of the different domains, and, thus, understanding the consequences of competitive breaks on individual and collective performance. Keeping the research strategy used by the different authors cited in this work, through the studies related to the existing divergences found in the detraining period, it is necessary to also explore the effect on the technical and behavioral variables as a result of the detraining period, bearing in mind the scarcity of studies regarding this topic and the importance of these variables in the game.

Obviously, as previously mentioned, there is a predominance of studies performed during the period between seasons concerning male seniors, and in view of the above, future research should also focus on younger age groups, non-professional football players and female athletes. Finally, in relation to the period of detraining, it is also essential to develop studies that consider competitive breaks that take place within the season, such as international competitions, vacations, and injuries, among others.

CONCLUSION

The main conclusion this study highlights is the urgent

need to create accurate and reliable guidelines so that coaches can properly apply specific training programs during competitive breaks in soccer. The correct application of this kind of training program will allow players to maintain their individual and collective performance, reducing losses on previously achieved gains in physiological, technical and behavioral domains. Furthermore, the application of these specific training programs will contribute to the improvement of the physical condition of soccer players, increasing the tolerance to imposed training loads, reducing the appearance of injuries. Tactical constraints are fundamental in the performance of football players, however, and despite this recognition, the player's assessment is essentially based on technical, physiological and biomechanical aspects [46]. In terms of detraining, the same was true, being crucial to understand the consequences in terms of tactical aspects. Finally, our results suggest that competitive breaks in soccer can have a negative impact on player's performance, but there is still no consensus in the literature on the topic and therefore, further investigation is still needed to clarify the potential impact of competitive breaks.

SUGGESTIONS FOR FURTHER RESEARCH

Following a new trend of investigation and in order to respond to the gaps previously evidenced in the literature, future investigations can be guided in different key aspects of this theme. Considering a recent investigation [25], the development of new studies is recommended in order to define in an effective and detailed way the effects of the detraining periods that soccer players go through during the competitive season.

Thus, in order to be able to answer those needs, firstly, it is important to have an exhaustive assessment of the main effects of detraining associated with different competitive breaks (*i.e*., short and long term) and its impact on soccer players regarding physical, technical and behavioral performance. In relation to physical performance, these works should involve and evaluate the greatest possible number of abilities that influence the performance of soccer players, and so far, to the best of our knowledge, no study has been carried out in order to assess changes in flexibility resulting from a detraining period between sporting seasons [9].

In addition, behavioral variables also need to be further investigated since the soccer players' individual and collective behavior is the result of an interaction between the different domains by which performance is affected, thus presenting itself as an extremely relevant topic to be studied.

When assessing the effects of detraining, studies must also consider the different periods of the season in which they occur since there are several works related to the competitive break in the transition period. However, few are those that analyze a competitive break over the competitive season [3]. The literature also demonstrates that competitive breaks in training levels lead to decreases in the physical fitness of young soccer players [5, 33]. However, the number of studies carried out in this age period regarding competitive breaks is limited [18]. Considering this fact, it is essential to develop comparative studies between different age groups and to evaluate the effects of these detraining periods throughout the competitive season.

Finally, it is essential that researchers in collaboration with coaches assess in detail changes in the performance of soccer players during periods of detraining. With the evolution of the sport, fundamental questions related to the theme are increasingly being raised, such as which adaptation assessments before and after the transition period are more effective, how the application of different training programs interfere in the subsequent injuries of the soccer players, their collective performance, physical fitness and psychometric markers throughout the season [2].

CONSENT FOR PUBLICATION

Not applicable.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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