Chapter 7
Periodization of Training Based on Small-Sided and Conditioned Games

Abstract The knowledge about the acute effects and adaptations that result from the small-sided and conditioned games (SSCG) may help the training periodization, particularly considering the weekly microperiodization. This chapter will summarize the physiological, physical, technical, and tactical effects of different task conditions. After that, a set of methodological considerations will be provided to help the coaches to identify the best periods of the week to apply specific SSCG. Finally, a proposal of weekly microcycle will be provided trying to help the coaches to identify the applicability of the scientific findings about these games in the practical context of the training.

Keywords Periodization · Small-sided and conditioned games · SSG · Soccer · Football · Training methodology

7.1 Introduction

The acute effects of each task condition in physiological, physical and technical performance were described in the previous chapters. After that, it is now moment to summarize the main evidences and highlight the most appropriate games for each period of the week. A brief graphical representation of the causes to increase and decrease acute physiological responses during small-sided and conditioned games (SSCG) can be observed in the following Fig. 7.1.

Moreover, using the information collected from different studies, a graphical representation was also generated to demonstrate the effects of task conditions in technical performance (Fig. 7.2). Both Figs. 7.1 and 7.2 aims to quickly identify the effects of different task conditions and which of these conditions must be used to design new SSCGs in the daily work of coaches.

If the aim is to maximize the intensity of exercise, smaller formats (1 vs. 1–4 vs. 4) and bigger fields contribute for the first step of SSCGs design. After that, coach may use touches limitations (1 to 3 touches as limit), no goals, man-to-man marking, and encouragement during the task. These variables contribute to reach heart rate values

F.M. Clemente, *Small-Sided and Conditioned Games in Soccer Training*,
SpringerBriefs in Applied Sciences and Technology,
DOI 10.1007/978-981-10-0880-1_7

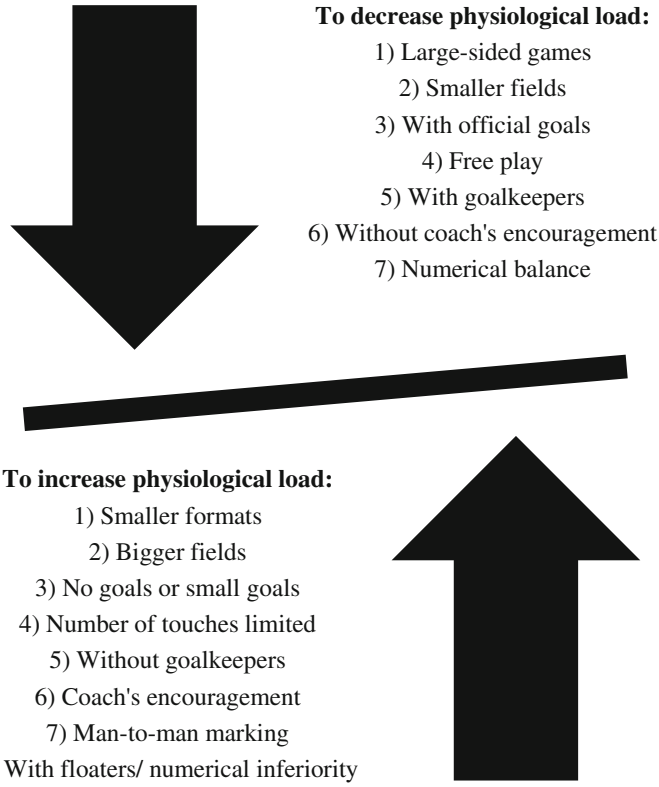

Fig. 7.1 Increasing and decreasing acute physiological responses using different task conditions in SSCGs

and blood lactate concentrations in the anaerobic levels. Nevertheless, the intensity of each task must be prescribed using intermittent regimen of training. Moreover, it is also important to highlight that coach may not use all the variables in the same game. The manipulation of variables must carefully respect the tactical aim of task and the plan for the training. The task should follow the training sequence and organization, and for that reason some conditions may not make sense in some training sessions or for some organizations.

Not only physiological and physical development must be considered to design the game. Technical performance must also be an important variable to be considered by coach. Smaller fields and smaller formats increase the individual participation of each player during the game. Nevertheless, such increase in the participation may also raise the fatigue effects. In that moment, coach must consider what he wants from the task: (1) develop technical performance; or (2) develop fitness levels. If the option is (1), it is important to increase the time to rest and decrease the intensity of exercise. Without such decrease in intensity, technical performance can be compromised. A reduction in motor coordination is normally

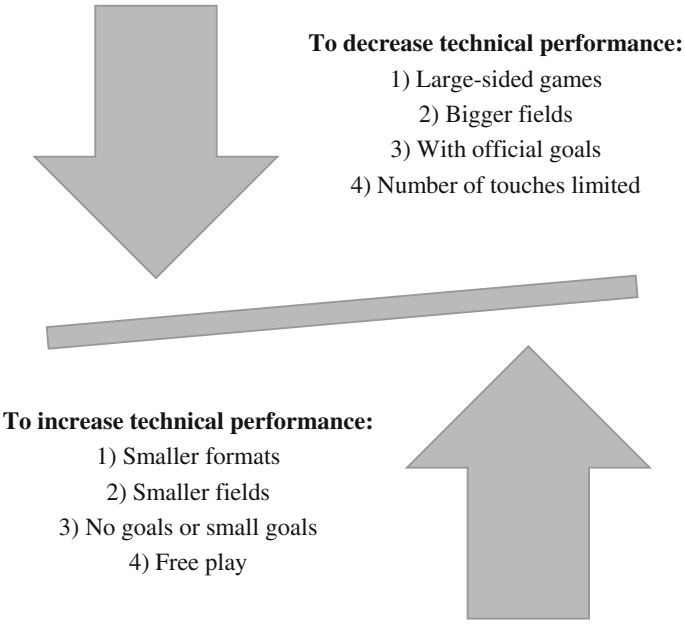

Fig. 7.2 Increasing and decreasing technical performance using different task conditions in SSCGs

verified in levels above 6 mmol/L of blood lactate concentrations (Janssen 2001). On the other hand, if the aim is to develop fitness levels, coach may follow a regular protocol for fitness development.

7.2 Aerobic and Anaerobic Development

The acute physiological effects of SSCGs lead to the intensities for aerobic and aerobic workout. For that reason, it is only necessary to correctly prescribe the games based on the knowledge of training methodology. Both aerobic and anaerobic systems must be developed and for that reason our aim is to briefly propose some methodological recommendations for the use of SSCGs considering the target of exercise.

7.2.1 Aerobic Training

Oxygen transport system can be improved by exercise. Tasks with medium- to long durations at submaximal levels are more appropriate to improve aerobic system

(Clemente et al. 2014b). Aerobic system will increase the ability to recover from great efforts, to more resistance at great intensities, and also to promote the shift to right in blood lactate threshold (Reilly 2007). In the specific field of aerobic training, it is possible to consider short-intensive training or long-intensive training. High-intensity interval training (HIIT) can be an example of short-intensive training and long-intensive training and can be linked to continuous regimens. Based on both types of aerobic training, let us provide the following recommendations in the Figs. 7.3 and 7.4.

Short-intensive aerobic training has duration between 3 and 6 min and a work-to-rest ratio of 1:1. Intensities between 85 and 90 % of HRmax are recommended for this type of workout. An increase in blood lactate concentration to 5–8 mmol/L is acceptable. The great intensity of this training may lead to a decrease in technical performance and for that reason the complexity of exercise must be small in comparison with long-intensive aerobic training. Simple skills and not a complex tactical thinking must be required on this kind of exercise. A great complexity may lead to a decrease in the exercise's intensity.

In the case of long-intensive aerobic training, a period of 6–15 min is adequate. Small values of blood lactate concentrations are expectable and heart rate intensities below 90 % of HRmax are predictable. The design of SSCGs for this kind of workout must include small fields and large-sided games. Other conditions recommended for this kind of training are free play, no coach's encouragement, and no floaters. A great tactical complexity must be introduced. The coach must emphasize

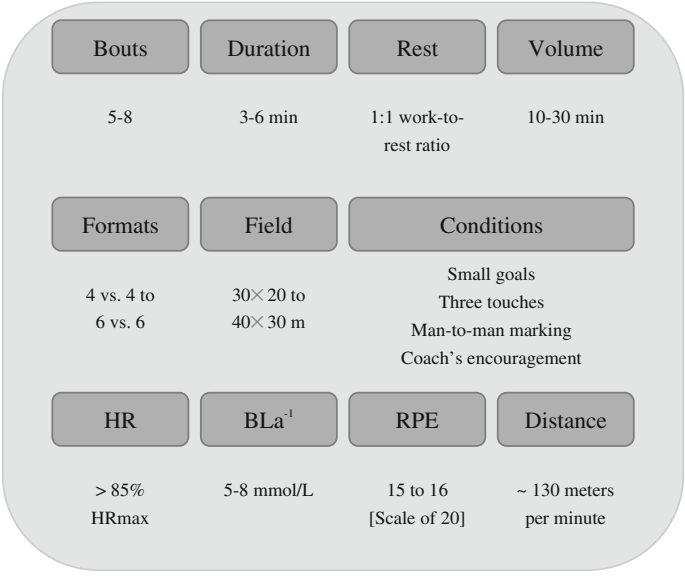

Fig. 7.3 Recommendations to design SSCGs for short-intensive aerobic training

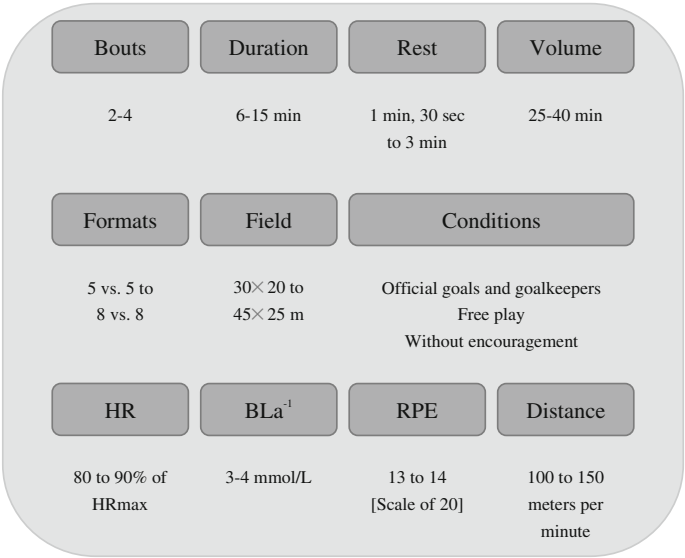

Fig. 7.4 Recommendations to design SSCGs for long-intensive aerobic training

tactical principles and tactical behaviors during this period. For that reason, less encouragement and more valuable and pertinent feedback are desirable.

7.2.2 Anaerobic Training

Glycolytic system is often present during soccer games. Values closer to 12 mmol/L have been found in elite soccer players, thus suggesting that lactate-producing energy system is highly stimulated. For that reason, the ability to repeatedly perform high-intensity tasks must be developed using anaerobic training (Clemente et al. 2014b; Reilly 2007). Smaller formats of the game and bigger fields are recommended to increase the acute physiological responses. Work-to-rest ratios of 1:1 or 1:1.5 are recommended for very high workouts. Task conditions such as touches limitations, no goals, man-to-man marking, coach's encouragement, and floaters can be recommended. Moreover, a small level of tactical thinking is desirable to keep very high efforts. Technical performance must be more relevant in these tasks than tactical behavior. The following Fig. 7.5 shows the summary of recommendations to design SSCGs for anaerobic training.

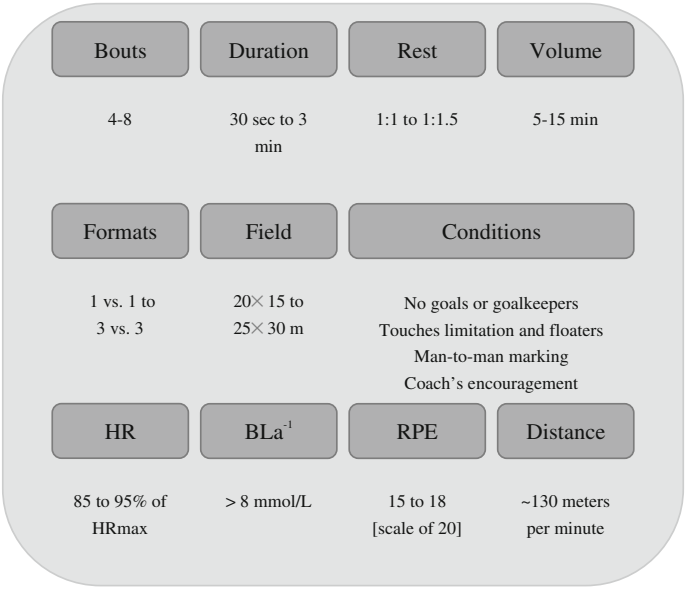

Fig. 7.5 Recommendations to design SSCGs for anaerobic training

7.3 Weekly Training Microcycle: Recommendations

Different periodization strategies may be adopted by coaches. Nevertheless, our aim did not describe the application of SSCGs for many possibilities of weekly training periodization. This option must be integrated in the plan of each coach and considering the requirements and properties of each team. This section will only present an example of weekly periodization for an example of tactical periodization (Delgado-Bordanau and Mendez-Villanueva 2012). Briefly, this periodization ensures stability in the blocks of training and fitness development, and only changes the type of games that is used to develop such capabilities. The main argument is that, during a season, a soccer team must be in a great level in all moments and not in extraordinary levels in some points and in a lower level in others. For that reason, there are very small variations of the load during the season and the weekly training load is almost similar week by week. This argument can be easily discussed by other ideas of periodization; nevertheless our aim is not followed for such route of discussion.

One of the main coaches that use SSCGs as principal tasks to develop his teams is José Mourinho. This coach has won two UEFA Champions Leagues, one UEFA Cup, eight Championships in four different countries (Portugal, England, Italy and Spain) with clubs such as Real Madrid, Chelsea, Inter Milan, and FC Porto. During a long interview about their training methodologies, with regard to periodization José Mourinho said (Oliveira et al. 2006):

> From the second microcycle of the preseason, all microcycles are basically the same until the end of the season. The principles of play and the work targets, as well as the physical training, follows the same microcycle over the season. Only with regard to specific tactical behavior there are some changes based on the opponents. Nevertheless, just talking about physical dimension that are more associated with traditional periodization, the targets are the same from the second until the last microcycle. The first microcycle is just to promote a functional adaptation after vacations, just trying adjust the players to making an effort, nothing more. In this first week we do not aim for any physical increments, but only a specific adaptation to the game. From the second week there are weekly cycles that repeat. Thus, I only use microcycles. My guidelines for the weekly standard are equal in July or April.

As Mourinho emphasizes, first weeks of preseason are used to increase the aerobic levels to support high intensities and efforts during the remaining weeks. This particular case must be considered and for that reason we will try to identify some topics and orientations about this specific moment of the season.

7.3.1 Preseason

Increase the volume and ensure that light to moderate levels of intensity takes the highest priority during the preseason. For that reason, aerobic workouts of moderate intensities are performed regularly during this period of the season (Bangsbo 1994). With the progression of the weeks, aerobic training with low to moderate intensities is gradually replaced by high-intensity workouts (Clemente et al. 2014a). Anaerobic training can also be gradually introduced during the weeks of preseason, fundamentally to improve the recovery capability from high-intensity workouts with great levels of blood lactate production (Clemente et al. 2014a).

Large-sided games (7 vs. 7 to 10 vs. 10) played at smaller fields during 4–5 bouts of 5–15 min and a recovery period of 1–3 min for an overall volume of 30 min is recommended (Clemente et al. 2014a). Gradually, smaller formats (4 vs. 4 to 6 vs. 6) may replace the large-sided games to progressively increase the intensities of training and promote cardiovascular adaptations. Let us provide in the Fig. 7.6, a suggestion of workout priorities during a season considering the suggestions made by Clemente et al. (2014a) in the article Periodization based on small-sided soccer games: theoretical considerations.

7.3.2 Weekly Periodization During the Season

Aerobic endurance performance of soccer players do not significantly change during the in-season period (McMillan et al. 2005). For that reason, after a period of great development (12 weeks after the beginning of preseason) in aerobic levels, the workout of this capability may only be performed during 2–3 sessions of the week. Such workout must also consider the competitive schedule of the team. For the case

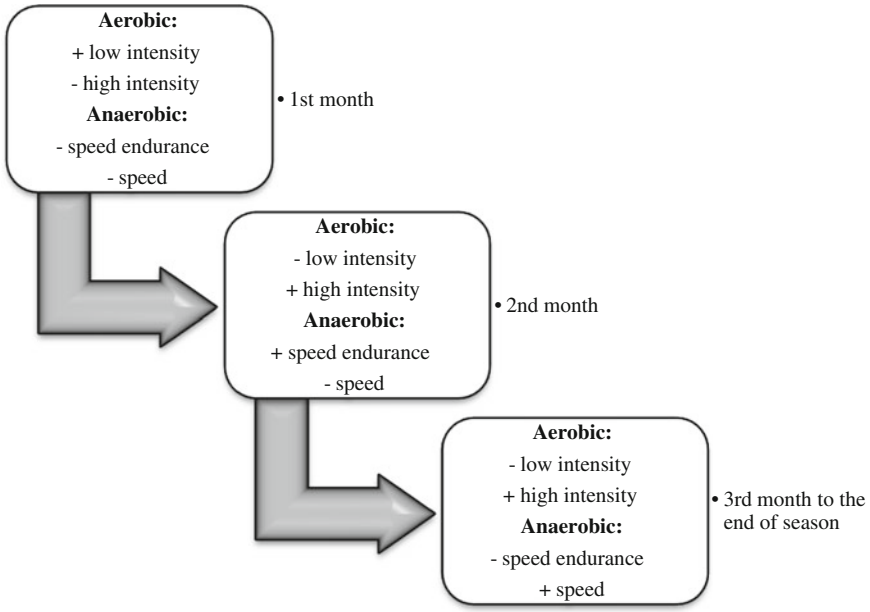

Fig. 7.6 Priority of fitness development during a soccer season

of teams that compete twice a week, the periods between games is only to recover and not properly to workout the capabilities.

Some studies have been showing that the highest volume of training is performed in middle week (Coutinho et al. 2015; Impellizzeri et al. 2004). Postmatch sessions are associated with low intensities (50–70 % HRmax) and the intensities are progressively increased to 70–90 % (middle week) and 90–100 % in the final sessions before the match (Whyte 2006). The preseason sessions are dedicated to short sprints and lower distances covered in comparison with middle-week sessions (Coutinho et al. 2015).

In some weekly periodization, the full rest day occurs in the day after match and in other occurs in the day after postmatch session (Owen and Wong 2009). This option varies from country to country and should be understood in the aim of the weekly workout. Taking into account the Italian example of periodization, there is no rest day in the middle of the week but rather 2 days of tapering are used with low stimulation before the match (Clemente et al. 2014a; Impellizzeri et al. 2004).

The weekly workload should change from team to team considering the fitness levels of players, tactical principles, and model of the game. The games used per session should also respect the main model of play and for that reason are discouraged the use of standard games. A careful analysis to the technical levels, tactical behaviors, and players' potential must be made before the design and application of SSCGs.

Table 7.1 Proposal of a weekly training periodization based on SSCGs

Volume	Match	Rest	Recovery	Aerobic and strength	Aerobic	Speed	Recovery
	Match	1 day after match	2 days after match	3 days after match	4 days after match	5 days after match	6 days after match
Formats	Match	Day off	7 vs. 7 to 8 vs. 8	2 vs. 2 to 4 vs. 4	5 vs. 5 to 7 vs. 7	1 vs. 1 to 2 vs. 3	7 vs. 7 to 8 vs. 8
Field (m)			40×25 to 45×25	25×20 to 30×35	30×20 to 40×25	20×15 to 25×30	40×25 to 45×25
Bouts			2 to 4	3 to 6	2 to 4	4 to 8	2 to 4
Duration (min)			6 to 15	3 to 6	6 to 15	0.5 to 3	6 to 15
Work-to-rest ratio			3	01:01	1 to 3	1:1 to 1:1.5	3
Volume (min)			15 to 20	10 to 30	25 to 40	5 to 15	15 to 20
%HRmax			60 to 75	> 85	80 to 90	85 to 90	60 to 75
Blood lactate (mmol/L)			3 to 4	5 to 8	3 to 4	6 to 8	3 to 4
RPE			13 to 14	15 to 16	13 to 14	15 to 18	13 to 14
Goals			Yes	Yes	No	No	Yes
Floaters			No	No	Yes	Yes	No
Encouragement			No	No	Yes	Yes	No
Man-to-man marking			No	No	Yes	Yes	No

Recovery days (postmatch and prematch) may be an appropriate moment to develop some general tactical principles, mainly considering the large-sided games that should be used in this period of week. Volume and the intensity are low and the training sessions must focus in some tactical issues.

The acquisition days occurs in middle week (3rd, 4th, and 5th days after match). Aerobic and anaerobic systems may be developed in this period of the week, mainly using greater volumes and intensities than in recovery days. Smaller formats and the use of other task conditions must be used to workout specific tactical behaviors and skills.

A proposal of weekly periodization for elite to U19 players is provided in the following Table 7.1. This proposal only makes some general recommendations for a weekly periodization with only one match per week. The design of the tasks must consider the strategies of coaches and the collective organization that should be the main priority to reply the reality of model of play.

7.4 Conclusions

This book was written for designing SSCGs and not to provide a 'magical formula'. A review of the majority of studies conducted in SSCGs was carried out and the fundamental results of these studies were summarized throughout the chapters. Comparison between the effects of SSCGs and traditional running methods was performed. No statistical differences were found. Acute physiological effects of different task conditions were analyzed. The physiological and physical load is similar to running-training methods. Moreover, technical development and tactical behaviors can be also workout during SSCGs. After that, a proposal for a weekly periodization was provided.

Future researches must consider analyzing the effects of different weekly periodization in soccer players. The scientific analysis to this application is small and without such information it will be harder to provide relevant information for coaches and for practical applications. For that reason, this analysis must be the next concerns of researchers interested in SSCGs.

Our aim was to provide the available information about SSCGs and to emphasize the benefits of SSCGs for soccer training. Nevertheless, the use of such games must be managed based on the principles of play and the orientations of the coach. For that reason, it is not recommended to provide examples of games. Provide scientific data and information that is more relevant to give the opportunity to coaches to design their own drills. This follows one old proverb: 'give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime'.

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