Home training recommendations for soccer players during the COVID-19 pandemic

Received: 16 May 2020
10.31236/osf.io/ycwvj
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Please cite as: Melim, A.M., Petiot, G.H., Clemente, F.M., Nakamura, F.Y., Aquino, R. (2020). Home training recommendations for soccer players during the COVID-19 pandemic. *SportRxiv*.
<https://doi.org/10.31236/osf.io/ycwvj>

All authors have read and approved this version of the manuscript. This article was last modified on May, 2020.

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Abstract

The new coronavirus (COVID-19) is an infectious disease caused by a newly discovered virus (SARS-CoV-2). This pandemic has a major impact on people's lives, and several governments ordered extended quarantine and requested social isolation to contain the spread of COVID-19 and flatten its contagion curve. Soccer practice was also severely affected by these pandemic effects, including the postponement of several championships, which involve large audiences. This process will be also dangerous for the players in the moment of returning to matches, mainly considering the abrupt spikes in the load that may occur in a very short term (from quarantine to competitive congested fixture periods). Here, we outline the benefits of home workouts using a multidimensional approach. First, we provide practical recommendations for physical, psychological, and tactical training. Next, we propose an example of a home training program spanning one weekly microcycle for soccer players, using load control based on the rating of perceived exertion. We highlighted that is crucial to make all these exercises fun and entertaining during the self-isolation period. In addition, coaches can adopt a video meeting with the players with the purpose to maintain the relationships and clear possible doubts about the workouts. The home training recommendations discussed and proposed in this article can and should be adjusted by the coaches according to their own ideas and athletes' access to equipment (e.g., treadmills, flywheel training, virtual reality). Finally, these recommendations do not apply to athletes showing any symptoms of COVID-19; in such case, self-isolation and complete rest are mandatory.

Key Points

Home physical training recommendations for soccer players should consider intermittent endurance, muscular power, muscular strength, accelerations/decelerations, and flexibility (see Table 1).

Perceptual-cognitive skills, technique, cognition, own performance, judgment in complex situations, and debates are excellent options to home psychological and tactical training (see Table 2).

Rating of perceived exertion (including week monotony) should be considered to load control during microcycles. Here, we provide an example of a home training program spanning (see Table 3).

We also recommend not to use social networks in smartphones or playing video games prior to the exercises involving perceptual and cognitive skills to optimize performance and limit the usage to the videos related to past performances. Note that this also reflects the opportunity to create this good habit in view of the moment competitions resume.

Introduction

The new coronavirus (COVID-19) is an infectious disease caused by a newly discovered virus (SARS-CoV-2). On May 15th 2020, the World Health Organization (WHO) presented in its report that there are 4,338,658 cases and 297,119 deaths in the world (37). This pandemic has a major impact on people's lives, and several governments ordered extended quarantine and requested social isolation to contain the spread of COVID-19 and flatten its contagion curve.

Soccer practice was also affected by these pandemic effects, including the postponement of several championships, which involve large audiences. For instance, this resulted in shutting down national and state tournaments around the world. Consequently, stoppage can result in a detraining process (i.e., the principle of reversibility of sports training), such as a decrease in physical performance and competitive performance (24). Moreover, this process will be also dangerous for the players in the moment of returning to matches, mainly considering the abrupt spikes in the load that may occur in a very short term (from quarantine to competitive congested fixture periods). For this reason, preventive exercises are recommended during the quarantine in order to minimize injuries in the return to the training activities (1, 17, 30). Thinking of minimizing the abrupt return process and its associated risks, players from several countries that have declared quarantine, such as China, Italy, Spain, France, United States, Portugal, Brazil, Argentina, amongst other countries, are adopting home training strategies.

Athletes are showing their training routines on social networks, performing exercises with body weight and/or with little equipment, in different spaces of the house like rooms, balconies and backyards. Exercises include muscle strengthening, balance activities, motor control/coordination, stretching or a mixed combination of these conditional and coordinative capacities (8). However, these practices can be improved in respect with the following scientific recommendations. Furthermore, home training should provide mental, psychological and tactical-technical stimulus during this self-isolation period. In this current opinion article, we outline the benefits of home workouts using a multidimensional approach (e.g., physical, psychological and technical-tactical stimulus). We first provide practical recommendations for physical training (Table 1) and for psychological and tactical training (Table 2). Next, we propose an example of home training program spanning one weekly microcycle for soccer players (Table 3).

Home Physical Training Recommendations For Soccer Players

Considering the scientific evidence, there are some practical and effective training approaches that can be conducted in-home aiming to mitigate the detrimental effects of quarantine. More specifically in relation to soccer, the type of training that most closely matches soccer's specific physiological demands is high-intensity interval training (HIIT) (7). Despite HIIT training can be conducted in different ways (e.g., running-based, indoor cycling), some researchers propose a training model with body weight using HIIT (15, 23). Additionally, to prescribe HIIT training for metabolic workout, other fitness variables as speed, strength and power can be also developed in this quarantine context using adjusted strategies (e.g., HIIT bodywork, jumps squats, straight-line run [5 m]) (23). The metabolic responses of the immune system vary according to the HIIT protocol, level of training and availability of energy reserves (10, 20). In addition, after three sessions of HIIT, a positive immunological adaptation occurs in 48 hours intervals of between sessions (10). Thus, for well-conditioned athletes, it is very unlikely that the HIIT protocols listed earlier will result in a relevant immune suppression.

One of the most practical and beneficial strategy to use in "home training" is plyometric training, since there is a great demand for eccentric force when performing jumps and it is closely related with multiple benefits for sports-related performance, e.g., speed, strength and power (4, 29). There are a wide variety of exercises for that demand, including jump against movement [CMJ], "dropbox" deep jump, with body weight, unilateral jumps, and light load jumps (3). The benefits of these training strategies are observed for both young and professional players as they promote an increase in neuromuscular strength, aerobic performance, change of direction, kick and sprinting speed (33, 36).

Considering the current unique scenario, we selected training means and methods with the scientific evidence of their potential in maintaining intermittent endurance, muscle power, muscular strength, and flexibility, which are specific for soccer players during the self-isolation period (Table 1). Therefore, coaches can use this material to help players in some insights in the prescription of "remote" training for young and professional athletes.

Table 1. Home physical training recommendations for soccer players. Note: PSE = Rating of Perceived Exertion; 1RM; a.u. = Arbitrary Units.

Physical Variable	Study	Original Sample	Original Protocols	Home Training Recommendations						
				Workouts	Weekly frequency	Sets	Repetitions	Rest (sec)	Session Duration (min)	RPE (a.u.)
Intermittent Endurance	Rabbani, Clemente, Kargar-fard and Jahangiri (27)	Semi-profes-sional	2x3 min (15'' high intensity and 15'' interval)	Stationary run; Mountain climbers; Quick feet forward and back; Quick feet and outs	2-3	20-30	30''	30'' passive	~20-30'	8-10 All-out
Muscular Power	Michailidis, Fatouros, Primpa, Michailidis, Avloniti, Chatzinikolaou, Barbero-Álvarez, Tsoukas, Douroudos and Draganidis (25)	Young athletes	4 exercises performed in 2 to 4 sets (separated by rest intervals of 90 to 180 seconds) of 5 to 10 repetitions per set	Explosive action high execution speed (double and/or single leg): Ski jump; vertical/horizontal jumps; lateral bound; split jumps; drop jumps; jumps + straight line (5 meters)	2-3	2-4	4-8	120'' passive	~30-40'	5-7
Muscular Strength	Loturco, Ugrinowitsch, Tri-coli, Pivetti and Roschel (22)	Professional	Half-squat exercise during first 3 weeks: wk1 – 4 sets × 8 rep (50% 1RM); wk2 - 4 sets × 8 rep (65% 1RM); wk3 - 4 sets × 8 rep (80% 1RM)	Nordic; Reverse Nordic; Push up; Squats; Steps up on bench; calf exercises; Copenhagen Adduction exercise	2-3	2-4	8-12	90'' passive	~30-40'	5-7
Accelerations/Decelerations	Buchheit and Laursen (5)	Professional	Straight line, change-of-direction (COD), COD + jump	Straight line (5-10 meters), COD (10-15 meters)	2-3	Until self-perceived loss of speed	Until self-perceived loss of speed	90'' pas-sive	~15-20'	8-10 All-out
Flexibility	De Paula Oliveira, Vieira, Aquino, Manechini, Santiago and Puggina (9)	Young athletes	Each series of exercises was composed of 30s of maintenance in the elongated position, followed by a 30s interval	Static stretching; passive stretching; ballistic stretching; proprioceptive neuromuscular facilitation (FNP)	2-3	2-3	2-3	30'' passive	~15-20'	2-5

Home Psychological and Tactical Training Recommendations for Soccer Players

We can assume that self-isolation has changed routine and life habits of soccer players, which would affect the components associated to tactics such as cognition and psychology. In fact, it is more likely that self-isolation will have led to the consumption of more medias for longer duration, and it can be detrimental to decision-making performance of players. Previous studies showed evidence of mental fatigue created by the use of smartphones or similar electronic devices on the quality of decision-making (11, 13). Despite the absence of these effects on actual play, we also recommend not to use social networks in smartphones or playing video games prior to the exercises involving perceptual and cognitive skills to optimize performance and limit the usage to the videos related to past performances. Note that this also reflects the opportunity to create this good habit in view of the moment competitions resume. Despite the availability of many games or similar activities that solicitate mental activity, tasks in relation to training and playing soccer are less likely to be performed. Happily, we can also see players and coaches publishing soccer-specific exercises on social medias with limited equipment. However, playing the game requires more than technical and motor training.

Given the relation between action in the play and decision-making activated with cognitive mechanisms (38), it is important to maintain cognitive-perceptual skills alive throughout the period of inactivity. Exercises that solicitate and challenge perception and cognition can be created with and without technological or expensive material. For instance, it is possible to mimic cognitive tasks activated with material as FITLIGHT Trainer™ (Speed & Agility Training | FitLight Trainer™ n.d.) using simpler material, aiming to combine kinematic reactions to stimuli (2). In its simplest form, a possible corresponding exercise would consist in throwing objects (e.g. balls, cones) of different shapes or colors and require catching/hitting the ones of a same shape or color before they fall on the ground. The same logic can be applied to technical drills where the movement is performed according to a signal. The authors of the review cover more equipment that may be owned by some families, but not by a majority. Hence, stimulating quick perception with household equipment may be possible with a hint of creativity and could add on the physical exercises previously listed.

However, the game is played in cooperation with – and opposition against more players (18). According to this concept of the game, players need to perform tactical actions in the play, making the game itself the only most representative context of play to train these actions. However, in the contemporary literature in this area, there are various activities that have the potential to bring small but valuable improvement to actions in the play and to their tactical

accuracy (31). Different from the physical training, tactical exercises performed out of the field would consist in: i) criticizing his own actions; ii) enacting experienced actions; and iii) debating “ideas of the play” using team organization, game model and strategy references. Such activities require mental imagery or video, which are two mediums accessible to everybody in home.

Both the auto-confrontation and explication interviews are usually guided by qualified researchers or professionals. Although, it is possible to offer to a companion a satisfying experience and lead him to bring back significative information back to consciousness. The principles of interviews are to describe the lived experience as if you lived it again without deliberately seeking for details or memories (35). This practically helps focusing on actions, including thoughts or even perceptions. As the name suggests, the interviews are interesting to do in tandem, where a companion will question the interviewee. In contrast, debates can be done with more persons as long as everybody stays involved (16). It’s also important to keep a clear reference throughout the conversation, which in that case can be the objective that the team must pursue. For instance, the group could focus on how to reorganize in transitions in respect with principles of play.

Table 2 presented some recommendations for home psychological and tactical training for young and professional players. Tactical exercises can bridge with coaches’ analyzing duty. Thus, it is important to keep the exercises fun for players whilst making them as useful as possible. A way to make sure of this is following mental imagery with corresponding technical exercises. This may pay more than just imaging as, in line with embodied cognition / decision-making frameworks, it is more useful for learning to perform actions. Plus, it gives a context to the rehearsal of technical movements. Also, enacting past experiences and performance during imagery may help more than emulating fictive experiences as it reinforces social links through memories and makes the activity. Accordingly, it is crucial to make all these exercises fun and entertaining during the self-isolation period.

Table 2. Recommendations for home psychological and tactical training in young and professional soccer players.

Ability Variable	Study	Original Protocols	Recommendations for Home Workouts
Perceptual-cognitive skills	Appelbaum and Erickson (2)		Combine a simple movement with a stimulus to react to Can also be mixed with physical exercises
Technique and cognition	Appelbaum and Erickson (2)		Combine a technical drill with a stimulus to react to Can also be mixed with physical exercises
Own performance	Kermarrec, Kerivel and Bossard (19), Sève, Saury, Theureau and Durand (28)	“Auto-confrontation” (32)	Watch a performance experienced in the past and comment your own action from a few seconds before to a few seconds after touching the ball. Operate for more significant actions with the ball or even actions without the ball
Judgment in complex situations	Gesbert, Durny and Hauw (14), Light, Harvey and Mouchet (21), Mouchet and Bouthier (26)	Explication interview (34)	Watch a performance experienced in the past one time only and mentally enact the action in respect with your memories, seeing it from your own eyes. Describe your feelings as you slow the actions down
Debates	Caty, Gréhaigne, Loizon and de Franche-Comté (6), Gréhaigne (16)		Watch a performance experienced in the past and discuss with peers the ideas of the play taking coach’s directives, game model or strategy as a reference

Despite a lack of scientific data related to the effects of home psychological, tactical, and physical training in soccer players, relevant insights can be gained through discussions between previous ideas reported in Table 1 and 2, and expert coaches who resolve this scenario in their clubs. Also, coaches must calculate the training load (e.g., rating of perceived exertion [RSP] * session duration [min]) and week monotony (average weekly training load / standard deviation of weekly training load) (12). Usually, monotony values should be between 0.8-2.0. Here, an example of home training programming over one weekly microcycle is provided in Table 3.

Table 3. Example of home training programming over one weekly microcycle for professional soccer players.

Microcycle	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Weekly TRIMP (a.u.)	Monotony (a.u.)
AM	Workouts Combine a movement with a stimulus to react to, e.g. the colored ball-catching exercise. Compete against a companion (3 challenges)		Auto-confrontation / explicitation interview in pairs or debates in sub-groups. Objective: give a context to an action to train (3 actions)			Combine a technical drill with a stimulus to react to, e.g. volleys or headers giving a direction according to a cue. Compete against a companion (3 challenges)			
	RPE (a.u.)	3-4	REST	1	REST	REST	5-7	REST	
	Session Duration (min)	30		30		30			
	TRIMP (a.u.)	90-120		30		150-210			
PM	Workouts Balance, Flexibility, Hip Mobility (2x1' each) Shoulder Gators; Knee Hugs Alternating; Dynamic Hamstring Stretching Alternating; World's Greats Stretch Alternating Stability/Activation (3x30"/30" rest) Plank; Airplanes (right and Left Leg); Balance on a single leg with your eyes closed Hip Mobility (2x1' each) Hip Cradles Alternating; Lateral Hip Openers; Reverse Lunge Reaches Alternating	Muscular Strength, Dynamic Mobility (2x1' each) Knee Hugs Alternating; Inchworms; World's Greats Stretch Alternating; Dynamic Chest Stretch; Stability/ Activation (3x30"/30" rest) Lateral Plank; Muscular Strength (3-4x 8-12/ 90" rest) Squat; Push Up; Dynamic Hip Lifts; Nordic; Reverse Nordic; Copenhagen Adduction exercise; Steps up on bench; calf exercises Flexibility Static Stretching	Muscular Power, Dynamic Mobility (1x1' each) Knee Hugs Alternating; Inchworms; World's Greats Stretch Alternating; Dynamic Chest Stretch; Stability/Activation (3x30"/30" rest) Lateral Plank Muscular Power (3-4x 6-8/ 120" rest) Explosive action high execution speed (double and/or single leg); Ski jump; vertical/horizontal jumps; lateral bound; split jumps; drop jumps Acc/Dess Run Straight-line (5m with 2m deceleration); Run change-of-direction (3m+3m+3m+3m with 1m deceleration)	Muscular Strength, Dynamic Mobility (2x1' each) Knee Hugs Alternating; Inchworms; World's Greats Stretch Alternating; Dynamic Chest Stretch; Stability/ Activation (2x30"/30" rest) Plank; Airplanes (right and Left Leg); Balance on a single leg with your eyes closed Muscular Strength (2-3x 8-10/ 90" rest) Squat; Push Up; Dynamic Hip Lifts; Steps up on bench; calf exercises Flexibility Static Stretching	Muscular Power, Dynamic Mobility (1x1' each) Knee Hugs Alternating; Inchworms; World's Greats Stretch Alternating; Dynamic Chest Stretch; Stability/Activation (3x30"/30" rest) Lateral Plank Muscular Power (3-4x 6-8/ 120" rest) Explosive action high execution speed (double and/or single leg); Ski jump; vertical/horizontal jumps; lateral bound; split jumps; drop jumps Acc/Dess Run Straight (5m with 2m deceleration); Run change-of-direction (3m+3m+3m+3m with 1m deceleration)	Intermittent Endurance, Dynamic Mobility (2x1' each) Dynamic Chest Stretch; Hurdle Steps Alternating Knee Hugs Alternating; World's Greats Stretch Alternating Stability/ Activation (3x30"/30" rest) Plank Alternative Legs Lifts Intermittent Endurance (4x 30"/ rest 30") Run in Place; Quick Feet and outs; Mountain Climbers; Quick Feet Forward and Back; High Knee March; High Skips; Jumping Jacks Flexibility Static Stretching	REST	1620-2290	1.70-1.86
	RPE (a.u.)	2-4	5-7	5-7	3-5	5-7	8-10		
	Session Duration (min)	30	60	60	50	60	30		
	TRIMP (a.u.)	60-120	300-420	300-420	150-250	300-420	240-300		

Conclusions

The training recommendations described in this article are only suggestions adapted from scientific evidence. Coaches must be creative and adopt a holistic view of workouts home intervention (e.g., physical, psychological, and tactical stimulus). In addition, coaches can adopt a video meeting with the players with the purpose to maintain the relationships and clear possible doubts about the workouts. Such as aforementioned, is crucial to make all these exercises fun and entertaining during the self-isolation period. We also recommend not to use social networks in smartphones or playing video games prior to the exercises involving perceptual and cognitive skills. The home training recommendations discussed and proposed in this article can and should be adjusted by the coaches according to their own ideas and athletes' access to equipment (e.g., treadmills, flywheel training, virtual reality). Finally, these recommendations do not apply to athletes showing any symptoms of COVID-19; in such case, self-isolation and complete rest are mandatory.

Contributions

Contributed to conception and design: AMA, GHP, FMC, FYZ, RA

Drafted and/or revised the article: AMA, GHP, FMC, FYZ, RA

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