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Letter to editor

FIFA World Cup Qatar 2022: Solutions to the Physical Fitness Challenge

Dear Editor-in-chief

In 2022, the FIFA World Cup has been scheduled to take place in Qatar in November and December, months which coincide with the in-season period of the European soccer season. This will be challenging for the staff of the participating national teams and the domestic clubs to which participating players are attached. The aim of this letter to the editor is to propose solutions on how to manage the associated challenges.

Regular training and competition over the course of a season in European professional soccer is generally characterized by a pre-competition preparation period of five to six weeks, followed by two competition phases, interspersed with a winter break (Eliakim et al., 2018). Certain leagues such as the English Premier League do not typically have a winter break meaning that games are played almost continuously across the season. During World Cup years, there is usually an average of four to five weeks between the end of national domestic championships and the start of the World Cup tournament (Table 1, Figure 1) which traditionally takes place during the off-season period.

However, in 2022, the FIFA World Cup has been scheduled to take place in November and December, months which coincide with the in-season period of the European soccer season (Figure 1). With the World Cup being staged during this part of the season, many national team players (notably those in the major European Leagues) will have just one week of preparation between the last match of their domestic leagues and the start of the World Cup tournament (November 20th, 2022). More precisely, the major European soccer leagues will interrupt match schedules between November 9th and 13th with differences in the number of games completed at this time of the season ranging from 14 to 17 across the various leagues (Table 2).

The physical and mental demands placed on modern professional players have steadily risen over recent years due to an increase in the number of matches played during congested periods across the season (Anderson et al., 2016). Since the number of matches is not evenly distributed across the typical 40-week season, players can often compete in as many as three matches in a seven-day period. Aside from the physical and mental demands that are imposed during a match, players might experience insufficient recovery between these games; in part due to extensive travelling which can disrupt the sleep/wake cycle (Lastella et al., 2019). Indeed, poor quality of sleep and the stress induced by a match can negatively affect physical fitness and may even increase the risk of sustaining injuries and/or infections (Clemente et al., 2021) in the period leading up to the World Cup.

National teams are composed of players from different leagues who have varying levels of exposure to match-play (e.g., starters, non-starters) in terms of the average weekly volume of soccer matches at their clubs ("Rapports - Observatoire du football CIES"). Moreover, both starters and non-starters are exposed to different external match and training loads (Anderson et al., 2016). External loads have previously been defined as the overall volume of activity that a player performs during both training sessions and matches (Ravé et al., 2020). There is evidence that this metric correlates with a player's physical fitness status (Clemente et al., 2019) and their injury risk (Malone et al., 2017). Accordingly, it will be challenging for national teams to manage the fitness of players such that they are physically ready to play at the World Cup tournament. This is especially applicable to individuals who play in the major European leagues and we note a significant contrast between European match schedules and those on other continents. For example, in Major League Soccer (MLS) in North America, match schedules will be interrupted from November 5th, 15 days before the World Cup tournament begins. Similarly, in the Japanese J-League in Asia, Saudi Pro League and Qatar Star League, matches will be interrupted one month before the World Cup tournament begins, leaving more time for players on these continents to prepare.

It is also important to note that the French, Spanish and English domestic championships will resume their match schedules on December 27th which is just ten days after the end of the World Cup (Figure 1). Clubs will clearly want their players to return uninjured and with sufficient fitness levels to resume domestic competition but these goals could be compromised by the aforementioned scheduling of the World Cup tournament.

Recommendations for players' preparation around the FIFA World Cup Qatar 2022

Before the World Cup, the goal of national teams and clubs is to prepare their players physically and mentally for the World Cup tournament. This is especially important for the non-starters of a club (Table 3) as it is well-known that a large sudden variation in external load is associated with injury risk (Gabbett, 2016). Moreover, there is evidence that players who sustain non-contact injuries during a national team's training camp, in preparation for a tournament, undertake lower subsequent training loads at their clubs when compared to the observed loads prior to that national team camp (McCall et al., 2018). In preparation for the World Cup, players who have played extensively for their clubs should focus on active recovery during the initial period of preparation for the tournament. Those players who have had relatively little exposure to competition should progressively increase training load during the national team training camp (Table 3). Club medical staff

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must take note of any traumatic injuries that players have sustained during the season before the tournament begins and should communicate, whilst respecting local data confidentially regulations, this with international technical staff with the aim of adjusting workload as necessary (Table 3). If this can be achieved, players can effectively transition to their national teams in a way that preserves their condition and serves as a basis for optimal performance at the World Cup.

Following the World Cup, a major challenge for clubs will be to reintegrate their players based on how far their national team has progressed and their level of exposure time during played games. Clubs will have many players who did not participate at the tournament and who will not have stopped training in the meantime. It is also important to consider the different categories of players who will participate at the tournament for example, those who were starters and left the tournament early or late and those who were non-starters and left the tournament early or late. Accordingly, external training loads will vary significantly as players arrive back at their clubs following the group stages and later.

All clubs will have ambitious goals for the end of the 2022/2023 season with both domestic and continental competitions (Champions League, European League, etc.) of high priority. Accordingly, club coaches will want their players to be available for the remainder of the season in full fitness and in optimal health. Additionally, players who are starters for their national team and their club will, in some cases, not have the opportunity for a break between the end of the World Cup and the resumption of the domestic soccer season. Research shows that injury risk is greater in leagues that do not have a winter break (*e.g.,* English Premier League) compared with leagues that do (Ekstrand et al., 2019b). Good communication between club medical and technical staff is essential to reduce injury incidence thereby optimizing the availability of players (Ekstrand et al., 2019a).

Before, during and after the World Cup tournament, intensive communication will be needed between the staff of the national teams and those in the clubs with regard to players' workloads as it is anticipated that some players may be exposed to physical stress levels that they are not used to. Exchange of information between national and club teams is therefore important to improve international players' health status (McCall et al., 2022).

External workload management during transitions between club and national teams before and after the World Cup will be crucial. Clubs and national teams use a variety of different external load tracking systems (e.g., global positioning systems and video tracking) and the quantification of this metric differs between teams (Jackson et al., 2018). Moreover, the scientific literature does not provide a consensus on acceleration and velocity thresholds during match play (Sweeting et al., 2017). Consequently, the characterization of external loads will vary between national teams and clubs. Given these barriers, it is essential that national teams and clubs communicate closely in order to share data and information on physical tracking systems and the different thresholds that they use to quantify external loads. In national teams and in clubs, subjective daily measurements of well-being can also be used to manage training loads (Thorpe et al., 2016; Watson et al., 2017).

Table 3 presents practical recommendations that can be adopted by club and national team staff according to the status of their players during the 2022/2023 soccer season. The overall objective is to have players physically ready and uninjured before, during and after the World Cup tournament 2022.

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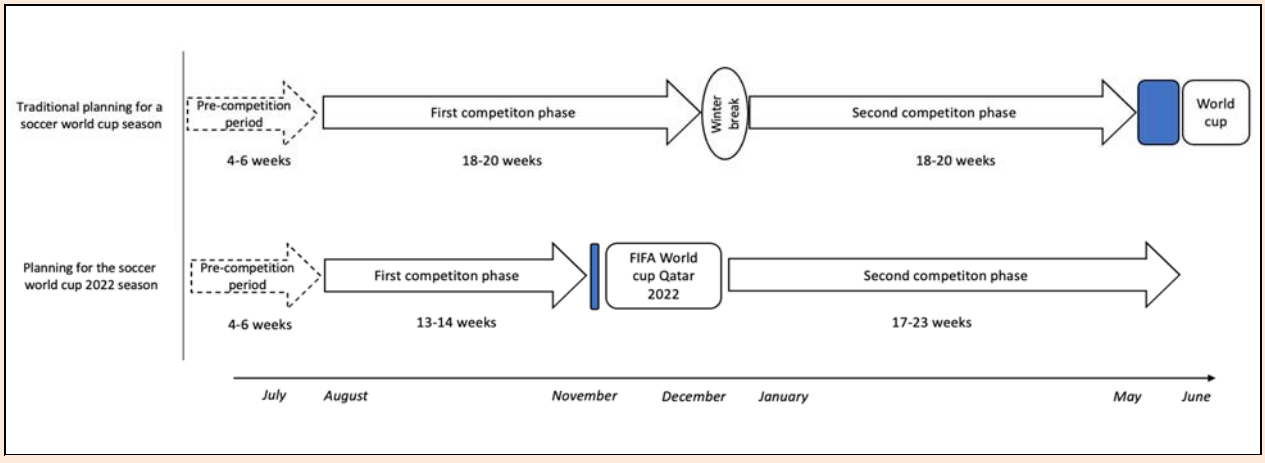

Figure 1. Planning of a traditional soccer World Cup season versus planning for the soccer World Cup 2022 season for the major European soccer leagues. In blue color: pre world cup preparatory periods.

Table 1. Duration between the end of the different national European soccer leagues and the start of the last three editions of the FIFA World Cup tournament.

World Cups	Seasons	Leagues	Number of weeks between the last championship match preceding the World Cup and the start of the World Cup
2010	2009/2010	*French LIGUE 1*	4
		Spanish LA LIGA	4
		English Premier League	5
		German BUNDESLIGA	5
		Italian SERIE A	4
2014	2013/2014	*French LIGUE 1*	4
		Spanish LA LIGA	4
		English Premier League	5
		German BUNDESLIGA	5
		Italian SERIE A	4
2018	2017/2018	*French LIGUE 1*	4
		Spanish LA LIGA	4
		English Premier League	5
		German BUNDESLIGA	5
		Italian SERIE A	4

Table 2. Final date and number of matches played before the FIFA World Cup Qatar 2022.

Leagues	Final date of played matches before the World Cup	Numbers of official matches played in championship before the World Cup Tournament (on average)
French LIGUE 1	November 13th	15
Spanish LA LIGA	November 9th	14
English Premier League	November 12th	15
German BUNDESLIGA	November 12th	15
Italian SERIE A	November 13th	15
Swiss SUPER LEAGUE	November 12th	16
Belgian JUPILER	November 12th	17
Dutch EREDIVISIE	November 13th	15

Final date of played matches before the World Cup Tournament 2022 and the number of matches played during the season until the FIFA World Cup Qatar 2022 in different European soccer leagues

Table 3. Examples of different programming approaches according to the player's status in the club and the national team.

Player status		Recommendations		
in the soccer club before the FIFA World Cup Qatar 2022	**in the selection for the FIFA World Cup Qatar 2022**	**for the preparation in the club before the FIFA World Cup Qatar 2022**	**for the training in national teams during the FIFA World Cup Qatar 2022**	**for the training in the club after the FIFA World Cup Qatar 2022**
Starters	**Starters**	Maintain an adequate chronic training load and implement injury prevention exercises. Communicate with national team staff on weekly training workloads and on the external load references of the player in competition. Communication between the medical staff on the medical and fitness status of the player.	Communicate with club coaching & support staff on weekly training workloads and adjust the workload. Maintain an adequate chronic training load adapted from the external load references of the player in competition and include preventive exercises.	Communicate with national team staff on weekly training workloads and adjust the workload. Communication between medical staff on the injuries and health issues suffered by the player during the World Cup. Promote physical and mental recovery.
Starters	**Non-starters**		Maintain an adequate chronic training load adapted from the external load references of the player in competition using workouts to compensate the decreasing playing time and maintain preventive work.	Communicate with national team staff on weekly training workloads and adjust the workload. Communication between medical staff on the injuries and health issues suffered by the player during the World Cup. Resuming group training.
Non-starters	**Starters**	Adjust training sessions to maintain an adequate weekly training load to compensate low competitive playing time. Include preventive exercise sessions. Communicate with national team staff on weekly training workloads and on the external load references of the player in competition. Communication between the medical staff on the medical and fitness status of the player. For starters players in selection: mental preparation for the upcoming world cup demands	Maintain an adequate chronic training load adapted from the external load references of the player in competition and preventive work.	Communicate with national team staff on weekly training workloads and adjust the workload. Communication between medical staff on the injuries and health issues suffered by the player during the World Cup. Promote physical and mental recovery.
Non-starters	**Non-starters**		Maintain an adequate chronic training load adapted from the external load references of the player in competition using workouts to compensate the decreasing playing time and maintain preventive work.	Communicate with national team staff on weekly workloads and adjust the workload. Communication between medical staff on the trauma and health issues suffered by the player during the World Cup. Resuming group training.

Note: Chronic training workload refers to mean training load over the previous three to six weeks (Gabbett, 2016)