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Exercise-Based Injury Prevention in Amateur Soccer: A Survey of Current Practices of 52 Algerian Teams

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Abstract

This study aims to investigate the injury prevention exercises used by Algerian amateur soccer teams. The present study collected data from some Algerian amateur soccer teams (From the second to the seventh division), during the season 2021–2022 (n = 52). A four-section online survey was responded. Only 12% of the teams use FIFA 11+. They often use activation and coordination exercises (72.4%), dynamic stretching (69.8%), and agility exercises (68.6%), but they sometimes use sprint and high-speed running (52.4%), concentric (53%), isometric (59%), vertical plyometric (59.4%), horizontal plyometric (56.2%), core exercises (63.2%), static stretching (63.8%), multi-joint exercises (63.2%), single leg strength and stability (61%), and they rarely use eccentric exercises (50.2%). Most coaches reported that they use these exercises during preparation and competition phases and they use them with all players. The investigation provided insight into the current use of injury prevention exercises by Algerian amateur teams, highlighting that several clubs used them, although there are differences between them in the extent of use. Moreover, this study provides information that may be useful for improving injury prevention strategies for amateur soccer teams.

Keywords: *non-contact injuries, injury prevention, preventive exercises, amateur soccer, teams' practices, Algerian coaches*

Introduction

Soccer is the most popular sport in the world with about 270 million participants (FIFA, 2007), and it is a high intensity contact sport that require a high physical level for match play, and this makes it the focus of many researchers in the sports field to achieve two main goals: improving performance and preventing injuries.

Injuries are part of soccer, and they occur frequently during games and training (López-Valenciano et al., 2019). However, many studies have shown that the incidence of injuries is higher in matches than in training (López-Valenciano et al., 2019; Ekstrand et al., 2009; Pfirmann et al., 2016). On the contrary, a Dutch study has shown that more injuries in amateur soccer occur during training (Van Beijsterveldt et al., 2015). These injuries also vary, including contact and non-contact injuries (Gizaa, and Michelib, 2005). Perhaps the most prominent existing efforts are focused on the prevention of non-contact injuries, including muscles, joint and ligament injuries (Lemes et al., 2021).

There are many ways to prevent non-contact injuries, and maybe the most effective is the reliance on certain physical ex-

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ercises (Chatterjee et al., 2015; McCall et al., 2020). In recent studies, it has been reported that sprint exercises are an effective limit for preventing injuries, especially in the hamstring muscle (Freeman et al. 2018; Mendiguchia et al., 2020; Prince et al., 2020). Goode et al. (2015) also have shown through a systematic review that eccentric training like Nordic exercise is effective in reducing hamstring injury.

There are also some programs aimed to improve neuromuscular control and reducing the risk of injury, which often contain strength, core, proprioception, plyometric and agility exercises under the name of neuromuscular training (Emery et al., 2015). These programs are often carried out in the form of warm-ups. FIFA 11+ (Bizzini et al., 2011), Harmoknee (Kiani et al., 2010), Sprortsmetrics injury prevention program (Noyes, & westin, 2012), and the Prevent Injury and Enhance Performance program (PEP) (Gilchrist et al., 2008), are examples to those programs.

Stretching exercise are also considered among the exercises used to prevent injuries (Thacker et al., 2004). Several studies have demonstrated its significant role in injury prevention and this is related to both types, static (Amako et al., 2003) and dynamic stretching (Costa et al., 2014).

The use of previous exercises varies from one team to another and from one level to another. Meurer et al. (2017) found that all Brazilian professional clubs used strength and functional training, core, balance/proprioception and eccentric exercises in their injury prevention program, while 88% of the clubs used FIFA 11+ program. McCall et al. (2014) found from a study on 44 teams from various premier leagues, that the preventing exercises used by these clubs were eccentric exercise, balance/proprioception, hamstring eccentric, core stability, Nordic hamstring and gluteus activation.

Injury prevention exercises are some of the most efficient tools for every coach or strength and conditioning coach when they want to protect their players from upcoming injuries. The purpose of this research is to describe the injury prevention exercises used by Algerian amateur soccer coaches.

Materials and methods

Participants

52 teams active in various Algerian amateur divisions (from the second to the seventh division) participated in this study for the 2021/2022 season. The survey was answered by the head coach or the strength and conditioning coach, if available in the team. The study was carried out following the Helsinki Declaration. The coaches have been informed of the aims of the study, their rights have been preserved, and they have participated voluntarily, and given the possibility to withdraw at any time.

Study design

In this study, a survey was relied on as a means of data collection to know the use of injury prevention exercises by Algerian amateur soccer teams. It consisted of a set of questions using check-boxes, multiple choice, free-text responses, and Likert scale. The validity of the survey and the clarity of its questions were confirmed by testing it on 4 amateur teams, and they were not included in the study.

The survey was built by looking at some previously published surveys (Meurer et al., 2017; McCall et al., 2020). And it was available online in arabic (https://forms.gle/rHhQtz9dXtKL9THa6) from September 19, 2021 to March 12, 2022.

Data collection method

The survey was divided into four sections. The first section included information about the team and the exercises they use in preventing injuries. The second section included questions about the use of injury prevention exercises, and the answer was yes or no. The third section consisted of questions to gather more accurate information about the extent to which these exercises are applied by answering: never, rarely, sometimes, often, and always. This is followed by the fourth section, which contained some additional questions about the use of these exercises (availability of equipment, its source, the phase of the season in which it is applied, the target players, and where they are implemented).

Statistical analysis

Data were analyzed using descriptive statistics. Mean ($\bar{x}$), standard deviation (SD), and percentages (n, %) were used according to the type of question, and Likert quintuple scale was used to answer the questions regarding the extent to which injury prevention exercises were applied as previously explained.

Results

52 Algerian teams from 25 states who are active in amateur leagues participated in the survey. Most of them are active in the honor division (sixth division) (30.8%), followed by the second division teams (17.3%), the third division teams (15.4%) and the pre-honorary division (seventh division). As for the first regional division teams (4th division), 11.5% of the total teams that answered the survey participated, as well as the second regional division teams (fifth division) participated with 9.6% (Table 1).

Table 1. Level of league worked in by coaches who responded

Second division	Third division	Regional 1	Regional 2	Honor	Pre-honor
9	8	6	5	16	8

These teams train from 3 to 6 sessions per week (4.19 ± 0.76 sessions), while only 37 teams use injury prevention exercises (71.15%), 12 of them use FIFA 11+ (32.43%), and they use injury prevention exercises as shown in Table 2.

Table 2. Injury prevention exercises used by Algerian amateur soccer teams

	Do you use this injury prevention exercises			
	Yes		No	
Exersises	N	%	N	%
Sprinting and high-speed running	21	56.75	16	43.25
Eccentric	24	64.86	13	35.14
Concentric	27	72.97	10	27.03
Isometric	29	78.37	8	21.63

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Table 2. Injury prevention exercises used by Algerian amateur soccer teams

	Do you use this injury prevention exercises			
	Yes		No	
Exersises	N	%	N	%
Vertical plyometric	23	62.16	14	37.84
Horizontal plyometric	22	59.45	15	40.55
Core exercises	35	94.59	2	5.41
Static stretching	28	75.67	9	24.33
Dynamic stretching	30	81.08	7	18.92
Activation and coordination	33	89.18	4	10.82
Resisted sprints	11	29.72	26	70.28
Multi-joint exercises	32	86.48	5	13.52
Single leg strength and stability	36	97.29	1	2.71
Agility	34	91.89	3	8.11

Twenty-three out of 40 coaches answered that they do not have enough equipment used in injury prevention exercises (57.5%) and 17 answered that they do have the required equipment (42.5%). Additionally, 77.5% of them rely on videos as a source for these exercises, 62.5% on websites, 57.5% on books, and 50% on researches and articles.

Most coaches answered that they focus on injury prevention exercises in both the pre-season and in-season phases (67.5%), and 27.5% of them reported that they focus on these exercises during the pre-season only, and 5% in-season phase only.

90% of the coaches answered that they apply these exercises to all players, while 10% answered that they only use them for players at risk of injury. Regarding the place of its application, most coaches apply it in both the stadium and in the gym (65%), while 32.5% apply it in the stadium only and 2.5% in the gym only.

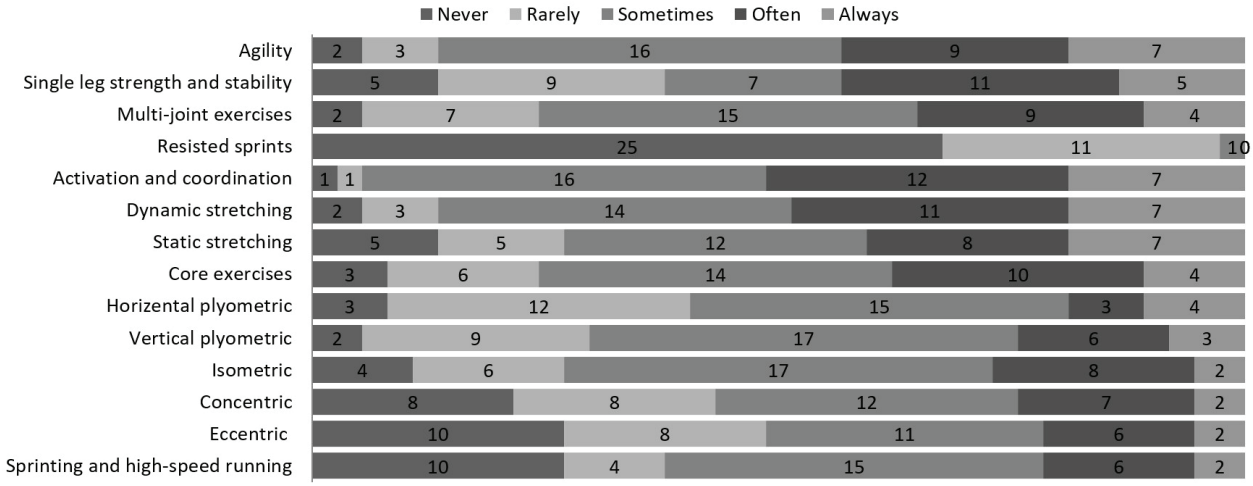

FIGURE 1. The extent to which Algerian amateur soccer teams used injury prevention exercises

Discussion

Concerning the FIFA 11+ warm-up program, it is considered among the training programs to help reduce the risk of injury by about 30% (Sadigursky et al., 2017) or 41% (Owoeyeet al., 2014). The results of the current study differed from the study of Meurer et al. (2017), which found that 88% of professional Brazilian teams use FIFA 11+.

Main findings of this study indicate that coaches often use activation and coordination exercises (72.4%), dynamic stretching (69.8%), and agility exercises (68.6%) as injury prevention exercise (Figure 1). These exercises are usually used in the warm-up, and they are effective in preventing injury, enhancing neuromuscular control (Emery et al., 2015), and improving joint functionality (Zech et al., 2009).

The exercises that they sometimes use are sprint and high-speed running (52.4%), concentric (53%), isometric (59%), vertical plyometric (59.4%), horizontal plyometric (56.2%), core exercises (63.2%), static stretching (63.8%), multi-joint exercises (63.2%), single leg strength and stability (61%), McCall et al. (2020) found out that these exercises are effective to prevent injuries, with balance/proprioception and core stability exercises being the most effective exercises for injury prevention that were used by professional teams (McCall et al., 2014). On the contrary, according to Mendiguchia et al., (2020) the most effective exercises for injury prevention are sprint and high speed running.

Coaches rarely use eccentric exercises (50.2%). However, McCall et al. (2014) shown that teams make a great use of eccentric exercises, especially the Nordic exercise. In addition, Small et al. (2009) found that the use of eccentric exercises during warm-up has an advantage over their use during the cool down in improving the eccentric maximum torque and eccentric hamstring muscle to concentric quadriceps ratio. Peterson et al. (2011) reported

that the addition of eccentric hamstring exercise decreased the rate of overall, new, and recurrent acute hamstring injuries in male professional and amateur soccer players. Elerian et al. (2019) also found that adding Nordic exercise as a pre-training reduces all hamstring injuries.

Finally, the resisted sprint exercises are used by few coaches. This may be due to the lack of the necessary equipment (Souidi and Cheriet, 2021), which is in line with the coaches' responses regarding the equipment availability in our study. However, according to McCall et al. (2020) resisted sprint exercises are somewhat to very effective for muscle injury prevention.

Conclusion

To the best of our knowledge, this study is the first to investigate the use of injury prevention exercises in amateur Algerian soccer teams. Most of the teams did not rely on the FIFA 11+ program, and they often used activation and coordination exercises, dynamic stretching and agility exercises. This may be due to the ease of application, especially during warm-up. It was also found that they sometimes use sprint and high-speed running, eccentric, isometric, core, multi-joint, and single leg strength and stability exercises, vertical plyometric, horizontal plyometric, and static stretching. On the other hand, they rarely rely on eccentric exercises, although they are among the most effective exercises for preventing injury.

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Disclosure of interest

All contributing authors declare that they have no conflicts of interest relevant to the content of this study.

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