



Incidence of cruciate ligament injuries in Saudi professional soccer league in the past 20 years



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ABSTRACT

This study aims to report the incidences and causes of cruciate ligament (CL) injuries in the Saudi professional soccer league in the past 20 years. Additionally, this study is also aimed to measure the association of the most common causes of injuries with age and the rate of injury recurrence in the Saudi professional soccer league. This descriptive epidemiology study combines published information online, TV news, and newspapers, about players and teams in Saudi Professional Soccer League from the year 2000 to 2020. Data were analyzed with graphs and tables of CL injury incidence by club type, frequency of matches, the position of players, age, and causes of injury. In addition, we also assess the recurrence of injury among the players. Our results revealed that CL injury is common among players in the Saudi professional soccer league. Contact with other players or opponents is the leading cause of this injury (61.9%). In terms of players' position and CL injury, the center midfielder is more susceptible (34.9%) than players in other positions. Age-wise, young players between 20-25yr (42.9%) and 25-30 years (39.7%) of Soccer age sustain more injuries than older players (14.3%). The incidence of injury among Saudi players during this time was higher than that recorded for the non-Saudi professional player. In our study, we found that CL injury is established among players in the Saudi professional soccer league most of which was due to contact with another player. Our findings can serve as a valuable reference to understand how the frequency of participation in the match, and pressure from media and fans could affect players' performance and contribute to the cause of injury.

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1. Introduction

The professional sports industry is a suitable channel for massive investment (Memari et al., 2020). Europe's leading soccer clubs, for example, generate annual revenues in excess of €100 million (Buchholz and Lopatta, 2017). The transfer of players is one of the core financial strategies to generate significant and recurring returns for some clubs.

Soccer is globally considered the most popular sport worldwide in terms of both audience and participation (Brophy et al., 2015). Saudi professional soccer league is one of the top leagues in Asia and is considered number one in the Arab region (FIFA). According to Transfer Market

(information and statistics about soccer and other sports), the Saudi professional soccer league is ranked second in Asia, and 16 worldwide regarding market values. The value of the Saudi league reaches the level of €316 million (after the China professional league whose value reaches €355 million). Therefore, well-known international players have shifted into the Saudi professional league with great contract values. Those players added a tremendous positive impact on the level of competition and performance.

On the other side, injuries are common incidents in professional sports, especially those kinds of sports with physical contact between competitors like soccer and basketball. "Soccer is considered a contact sport, and it puts many demands on the technical and tactical skills of the individual player (McAllister et al., 2012). Injuries have very considerable impacts on teams' performances, and they are the most common reason for players to miss training and matches. Therefore, sports injuries are the biggest threat to sports investment, and they pose a negative impact on the investment process as

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many professional athletes have lost their careers because of sports injuries (Brito et al., 2012; Richardson and McKenna, 2020).

The knee joint is the largest and most complex synovial hinge joint in the body. Being a weight-bearing joint, the knee joint is highly susceptible to injury, especially in sports such as Soccer (Sandon et al., 2020). Structurally, the knee is formed by three bones: the femur, the tibia, and the patella. It is composed of two articulations: the tibiofemoral

hinge articulation between the femur and the tibia, and the patellofemoral gliding articulation between the patella and the femur (Zhang et al., 2020). The capsule provides the stability to the joint with arranged structures including ligaments, synovial membrane, bursae, and menisci. Synovial fluid is released from the synovial membrane to lubricate the joint and facilitate movement by reducing the friction between the articulating bones (Masouros et al., 2010) (Fig. 1).

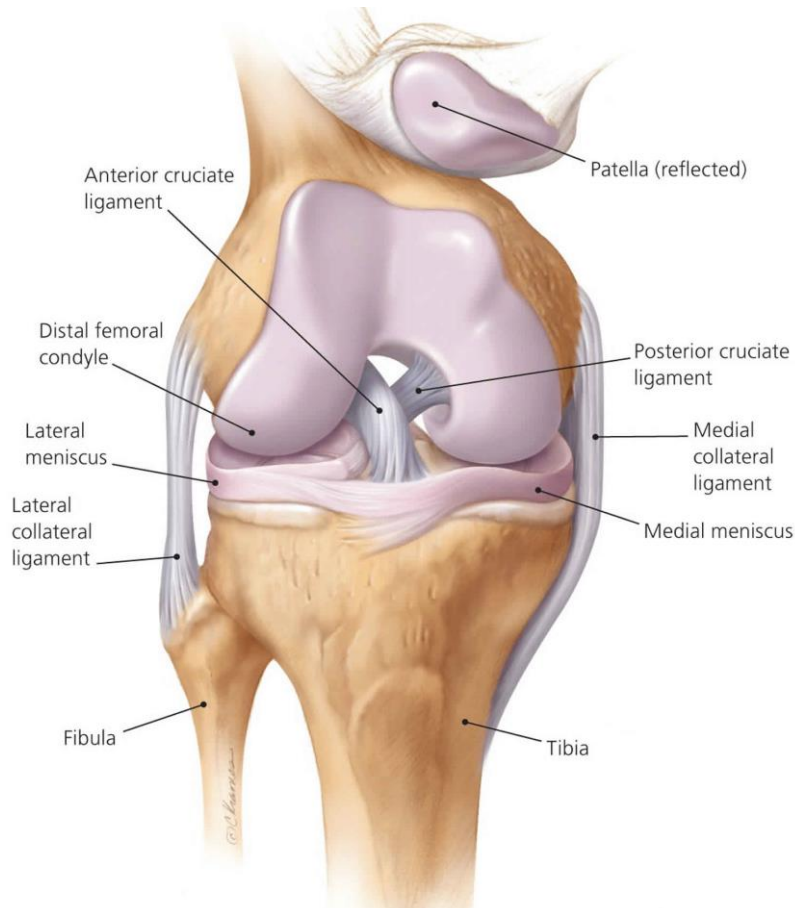


Fig. 1: Anatomy of the knee joint

Cruciate ligaments (CLs) are two tough bands of fibrous tissue that function to connect the bone of the thigh (femur) to the bone of the leg (tibia) at the knee joint. Together, the anterior CL and posterior CL bridge the inside of the knee joint, forming an (X) pattern to stabilize the knee against front-to-back and back-to-front forces (Hirschmann and Müller, 2015) (Fig. 1).

CL injury is a major sports injury that leads to knee problems (Sandon et al., 2020; Zhang et al., 2020). By extension, this could lead to long-term knee disability and health concerns with serious economical and psychological implications for patients. Patients seeking to return to sports activities often undergo CL reconstruction (Frobell et al., 2013) even though recurrence of CL injury has been reported (Gans et al., 2018; Raines et al., 2017).

The anterior cruciate ligament (ACL) can become injured when the knee joint is bent backward, twisted, or bent to one side or another (Boden et al., 2000). Injury chances are higher when one or more

of these movements occurs simultaneously. Contact has also been shown to cause an ACL injury. This type of injury will often occur when playing sports. It can happen when the foot is planted firmly on the ground and a sudden force hits the knee while the leg is slightly bent or straight. It can occur when changing directions quickly, slowing when running, or landing when jumping. It tends to be common in soccer, skiing, and other sports where a lot of weaving, jumping, starting, and stopping occurs (Malempati et al., 2015; Vinagre, 2017). Posterior cruciate ligament (PCL) injury, however, happens often far less than the ACL (Pache et al., 2018), and it causes less pain, disability, and knee instability (Voos et al., 2012).

Symptoms of CL include joint effusion, altered movement and loss of balance, muscle weakness, and reduced functional performance. Severe pain and rapid swelling are also among the symptoms of CL injuries that have been observed.

An evaluation of sports injury is necessary to help identify the most common causes of injury and therefore prevent it in future sports activities. Such evaluation or analysis may help to cut the cost of medical maintenance and supply in sports (Ekegren et al., 2016; Sigward et al., 2018).

The aim of this study is to report the incidences and causes of CL injury in the Saudi professional soccer league in the past 20 years. Additionally, this study is also aimed to measure the association of the most common causes of injuries with age and the rate of injury recurrence in the Saudi professional soccer league.

2. Methodology

This is a descriptive epidemiology study of the distribution of CL injuries in terms of person, place, and time. Data were collected from the documented media report and published information in sports magazines, newspapers, and online from the year 2000 to 2020. As such, ethical approval was not required, and the history of injury for players and teams as posted on the TransferMarkt website was collected. The records of CL were extracted and included in the study. The data were deemed valid if reported by more than one source. Data collected include a description of players including age during injury, position played in the team, frequency of team participation in the league, type of club (Mass or non-mass club), frequency, and causes of injury among team members. In addition, we also considered the frequency of injury recurrent and its causes. The rate of injury among Saudi professional players and non-Saudi was also evaluated. Documented causes include contact with the opponent, imbalanced position, injury during the team training session, and injury as a result of the inappropriate pitch.

2.1. Data collection

It was done three times for a period of 5 months to ensure that accurate data concerning players, teams, and injuries were recorded. Collected data were entered into a structured Excel sheet. Names of clubs and players are undisclosed to respect the privacy policy of the teams and players.

2.2. Statistical analysis

Data were subjected to descriptive statistics of SPSS version 24.0 for analysis (SPSS Inc., Chicago, IL, USA). Results are presented in frequency and percentage, and the value for the individual group was compared by student t-test. Statistical significance was declared when differences were observed at a P-value of <0.05.

3. Results

The total number of players included in this study was approximately 7000 players. This number is based on the regulation of the Saudi professional league that requires only 25 players for each team in a single season. During the seasons of 2000-2009, there were only 12 clubs officially registered in the league. From 2010-2017, the number of clubs raised to 14 official clubs. From 2018-2020, the total number of clubs became 16 official clubs. Therefore, from 2000-2009, approximately 3000 players were registered officially in the league. From 2010-2017, 2800 players were registered. From 2018-2020, only 1200 players were registered. The total matches from 2000-2020 were approximately 3496.

The summary of the incidence of CL injury in players including age group, causes, type of teams, players' position, and the recurrence of injury is presented in (Table 1).

Table 1: Summary of the incidence of CL injury in different categories

Categories	Inputs	Frequency	%
Causes of Injury	Contact with opponent	39	61.9
	Imbalanced position	8	12.7
	Team training session	14	22.2
	Inappropriate pitch	2	3.2
	Striker	12	19.1
Players' Position	Center Midfielder	22	34.9
	Center Defensive Midfielder	9	14.3
	Defender	17	26.9
	Goalkeeper	3	4.8
Age during Injury	< 20 y	2	3.2
	20 - 25 y	27	42.9
	25 - 30 y	25	39.7
	30 y and above	9	14.3
Age during Injury	Less than 30 years	54	85.7
	30 years and above	9	14.3
Injury Recurrence	One time	52	82.5
	More than one time	11	17.5
Large clubs with High Participation in Multi Competitions	Yes	50	79.4
	No	13	20.6
Mass Clubs (A - B - C - D)	Yes	38	60.3
	No	25	39.7
Big Clubs in Championship Possession	Yes	50	79.4
	No	13	20.6

Our analysis revealed significant information on CL injury during the last 20 years in Saudi Professional Soccer League. As presented in (Fig. 2), players from the most participating clubs recorded the highest incidence of injury (50, 79.4%) while the clubs with the least participation have the lowest records of injury among their team members (13, 2%). Age-wise, injury among young players between

20-30 years (85.7%) is higher than those of older age (>30) (Table 1). Approximately 61.9 % of injury was due to contact with the opponent while injury during training session accounted for 22.2% of the causes of injury. The imbalanced and inappropriate pitch accounted for 22.2% and 3.2% respectively (Fig. 3).

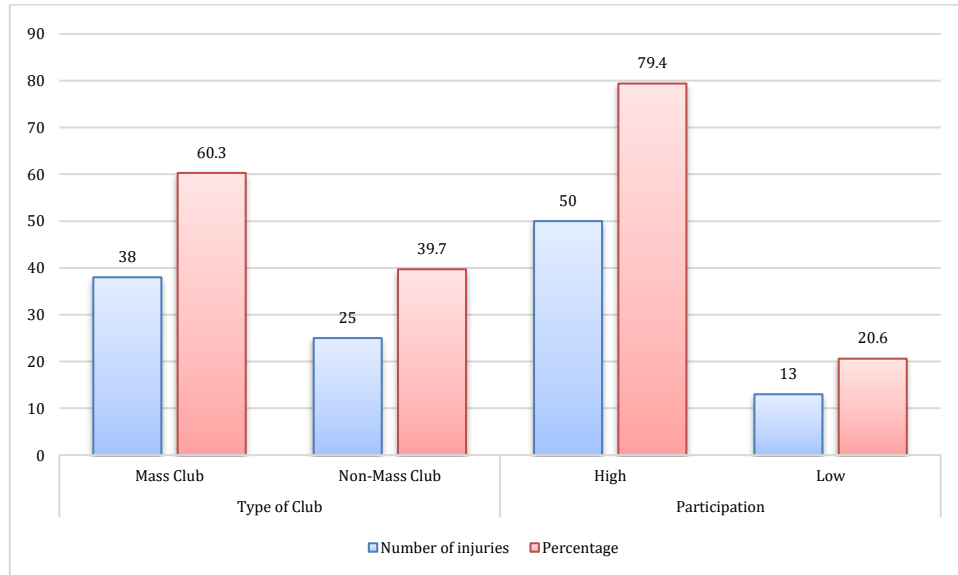


Fig. 2: Incidence of CL injury in different club types

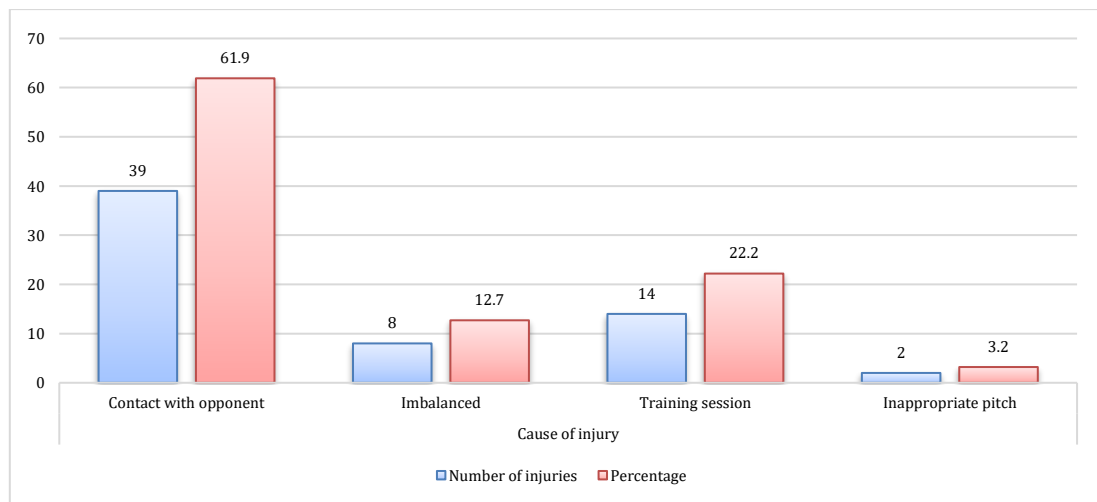


Fig. 3: Common causes of CL injury

In terms of players' position and rate of injury, this study revealed that center midfielders are more susceptible to injury than players in other positions followed by the defender (26.9%), striker (19.1%), center defensive midfielder (14.3%), while the goalkeeper was the least susceptible (4.8%) (Fig. 4). Regarding injury reoccurrence, it is demonstrated in (Table 1) that the recurrence at once was (80.9%) while the recurrence more than once was (17.5%). We observed a striking difference in the incidence of CL among Saudi national players and foreign professional players (Fig. 5). Our result suggested that Saudi national players are more susceptible to CL injury than foreign professional players.

As presented in Table 2, contact injury with the opponent is the most common cause of injury that is

associated mostly with young players (less than 30 years) and with reoccurs more than once with a frequency of (63% and 81.8%) respectively. The team training session is the second most common and leading cause of injury that is linked with ages less than 30 years and with recurrence at once (25.9 % and 26.9 % respectively). The inappropriate pitch was the least common cause of injury that is liked with young players less than 30 years and with recurrence more than once.

4. Discussion

This study presents an overview of the incidence, causes, and recurrence of CL injury in the Saudi professional soccer league. There is little to no

published information about CL injury in the Saudi professional soccer league. Our principal observation was the high incidence of CL injuries in players of mass clubs most of which were due to contact with

the opponent. CL injury due to contact was also observed to reoccur more than other identified causes.

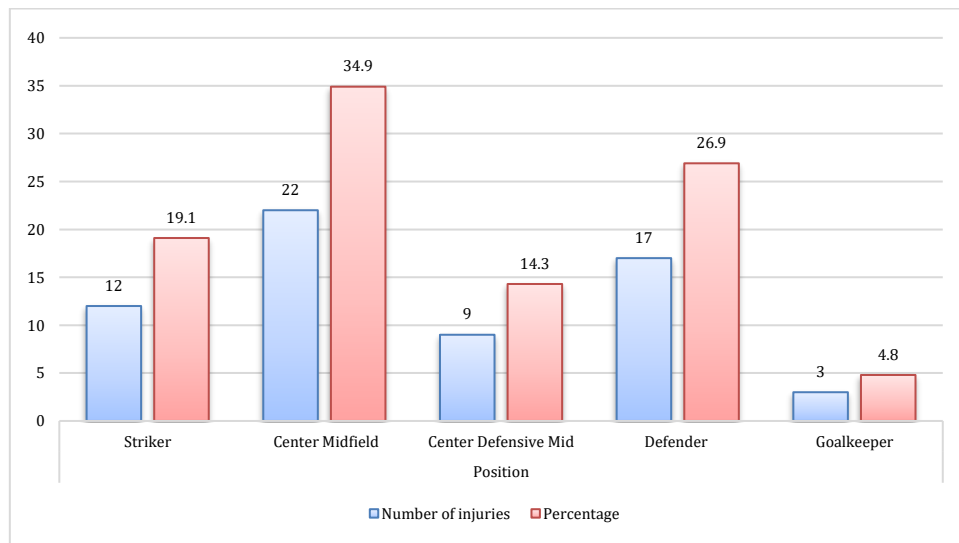


Fig. 4: Incidence of CL injury according to player position

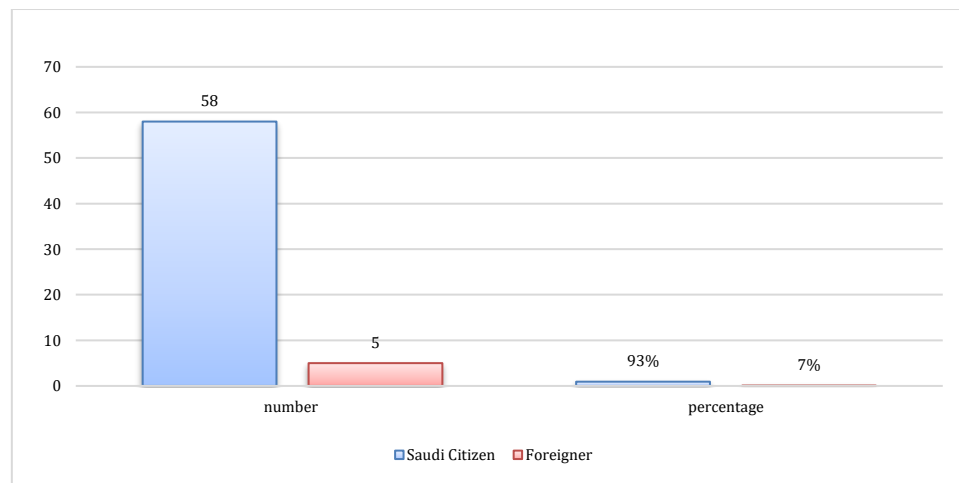


Fig. 5: Incidence of CL injury in Saudi and non-Saudi players

Table 2: The association of injury causes with the age and the rate of injury recurrence

Categories	Inputs	Causes of Injury				P-value
		Contact with Opponent	Imbalanced Position	Team Training Session	Inappropriate Pitch	
Age during Injury	Less than 30 years	34 63.0 %	5 9.3 %	14 25.9 %	1 1.9 %	0.046
	Above 30 years	5 55.6 %	3 33.3 %	0 0 %	1 11.1 %	
	More than one time	9 81.8 %	2 18.2 %	0 0 %	0 0 %	
Injury Recurrent	Only one time	30 57.7 %	6 11.5 %	14 26.9 %	2 3.8 %	0.208

The high case of injury observed in the mass club (the top leading clubs) which is similar to the observation of Muaidi (2019) is possibly an indication of how players were overworked or pressured (perhaps because of the glory of the team or expectation of their large fans), and how they were quickly replaced so that the club or team do not miss participation. Pressure may have come from fans, media, and the team itself due to the match loads and the zeal to triumph. This is reasonable as the highest cause of CL injury was contact with the

opponent which is in agreement with the previous report by Muaidi (2019) and Rebelo et al. (2012). On the side of the team, this may seem like very efficient and profitable management of players.

However, injured players only had the chance to opt for non-mass clubs or retire from sports depending on the severity of the CL injury (Richardson and McKenna, 2020). It should be noted that among sports injuries, CL injury has the most impact on the lives, emotions, and careers of athletes. Contrary to the report of Brito et al. (2012)

who did not find differences among Portuguese youth players of different age groups, our observation suggests that young and early career players between ages 20 and 24 have the highest incidence of CL injury among the age groups. The study however recorded a higher incidence of severe injury in the lowest age group. Our observation is that different regulations and opportunities are there for young players in different countries and hence may affect players' commitment and pressure handling. Although several studies found ultimately no agreement regarding the effect of player position on general injury risk in male soccer, our study reveals that center midfielders are more susceptible to CL injury than any other positions (Della Villa et al., 2018; Shalaj et al., 2016; Dauty and Collon, 2011; Mallo et al., 2011). This finding matches the finding of Deehan et al. (2007) with a significantly higher risk in midfielders in youth soccer. It might reflect the accountability and the roles of MFs to connect the entire team together with massive effort on the field. Other studies supported our findings that goalkeepers are least susceptible to CL injury (Aoki et al., 2012). This indicates that the somatotype and role of GKs may reflect a predisposition to a different pattern of injuries.

The striking difference observed among Saudi and non-Saudi players with regard to frequency and susceptibility to CL injury could be attributed partly to the domination of Saudi national players in the teams. More than half of the teams are Saudi nationals. In addition, there is a clear difference in the lifestyle of players of different origins and this could play a role in their health and strength. The lifestyle of Saudi players may differ from that of non-Saudi professional players in terms of healthy eating habits, body weight maintenance, and amount of sleep and rest.

Although there is a paucity of information concerning injury generally and in particular, CL injury among Saudi professional soccer league players, this study could increase the awareness and need to document injuries among players. This will lead to better team management in terms of players' health and performance.

5. Conclusion

Our analysis revealed CL as a significant injury that is established among players in the Saudi professional soccer league. Most of the cases of CL observed were due to contact with another player and it is mostly reported in the club with many participations. These reports can serve as a valuable reference to understand how the frequency of participation in the match, and pressure from media and fans could affect players' performance and contribute to the cause of injury.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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