



## CROSS SECTIONAL STUDY

# Prevalence of Anterior Cruciate Ligament Injury and other Ligament Injuries among the Saudi Community in Jeddah City, Saudi Arabia

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### Abstract

**Background:** The anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), medial collateral ligament (MCL) and lateral collateral ligament (LCL) are types of cruciate ligaments. ACL is the most common injured ligament and it is important for stabilization of the knee. It is commonly injured especially in sports as a consequence, knee function and participation in physical activities will be limited. Our objective is to provide descriptive epidemiological data; study the prevalence as well as provide knowledge of the management of the anterior cruciate ligament injury and other knee ligament injury among Saudi community in Jeddah City, Saudi Arabia.

**Methods:** A cross-sectional study was conducted among the Saudi Community in Jeddah City, Saudi Arabia from May 2019 to August 2019. Target sample size was 300 respondents; minimum sample size was 250 respondents. We ended up collecting 282 of which 74 has cruciate ligament injury. The Saudi community received an online community to fill. The criterion that is included in the questionnaire are age, gender, nationality, whether sports was practiced and key questions that revolves about injury to the knee ligaments such as previous tear in the ligaments of the knee, which ligament was injured; ACL, PCL, MCL or LCL. Injured knee; right, left or both, type of cruciate ligament injury; partial or complete tear, management used; surgical or physiotherapy, duration of healing time; less than 3 months, 3 to 6 months or more than 6 months and lastly was sports practiced after injury.

**Results:** This study reported the prevalence of ACL and other cruciate ligaments injury among the Saudi community in Jeddah City of 26.2%. The age of the studied ACL injury

cases ranged from 13 - > 50 years with mean age ( $\pm$  SD) was  $38.0 \pm 12.2$  years. Most of cases (91.9%) were males. As for side of the injured cruciate ligament, (55.4%) had anterior cruciate ligaments injury, (8.1%) had posterior cruciate ligament injury, (27.0%) has medial collateral ligament injury and (9.5%) had lateral collateral ligament injury and (13.5%) had the injury in both sides. In the majority (68.9%) of cases, ACL tear was partial, complete in (31.3%). (48.6%) underwent surgical treatment and (51.4%) went for physiotherapy.

**Conclusion:** Cruciate ligament injury is a common harm among the Saudi Population where the majority are male with (91.9). Right knee was more affected with (51.4%). Majority of the Injured ligament was the ACL with (55.4%) and lateral collateral ligament being the least with (9.5%). In terms of treatment (51.4%) of cases have undergone physiotherapy, while (48.6%) of cases have undergone surgical treatment. It is shown there there is no significant relationship between time of healing and side of injured knee. Notably there is less healing time for partial tear whereas with complete tear takes more time. Management with surgery takes longer time compared to management with physiotherapy.

### Abbreviations

ACL: Anterior Cruciate Ligament; PCL: Posterior Cruciate Ligament; MCL: Medial Collateral Ligament; LCL: Lateral Collateral Ligament; No: Number

### Introduction

The Anterior Cruciate ligament (ACL) which is located in the knee is the most common injured ligament and its reconstruction is a regularly preformed orthopedic

procedure [1,2]. The ACL is an important structure for stabilization of the knee, limiting rotation and translation [3,4]. A considerable amount of researches have been conducted in the target to specify the source of ACL injuries over the past 10 years [5]. Taking into account only few studies have been conducted on the occurrence of ACL injuries [6]. Due to the commonness of ACL injuries especially in sports, knee function and participation in physical activities will be limited and may give rise to knee osteoarthritis [7]. It has been recorded that most of the injuries were higher in males due to their higher link to the physical and athletic tasks [6]. In most countries ACL reconstruction operation is the ideal treatment while in Norway and Sweden a non-operative approach proves to be the best possible option with 64% of patients between 2001 and 2009 had a successful non-operative approach in the treatment of ACL [8-10]. The point of performing ACL reconstruction is to stabilize the knee and prevent further injuries in everyday life [11,12]. Before deciding whether the patient undergoes a surgical or a non-Surgical approach, the physician must guide the patient to the appropriate method. In order to decide the best approach for treatment the patient must have a clear knowledge about the clinical procedure [9]. Our aim in this research is to provide descriptive epidemiological data; study the prevalence as well gain knowledge of the management of the Anterior Cruciate Ligament and other knee ligament injuries among Saudi community in Jeddah City, Saudi Arabia.

## Methodology

A cross-sectional study was conducted among the Saudi Community in Jeddah City, Saudi Arabia from May 2019 to August 2019. Target sample size was 300 respondents; minimum sample size was 250 respondents. The Saudi community received an online questionnaire to fill. The criterion that is included in the questionnaire are age, gender, nationality, whether sports was practiced and key questions that revolves about injury to the knee ligaments such as previous tear in the ligaments of the knee, which ligament was injured; Anterior cruciate Ligament (ACL), Posterior Cruciate Ligament (PCL), Medial Collateral Ligament (MCL), and Lateral Collateral Ligament (LCL). Injured knee; right, left or both, type of cruciate ligament injury; partial or complete tear, management used; surgical or physiotherapy, duration of healing time; less than 3 months, 3 to 6 months or more than 6 months and lastly was sports practiced after injury.

Consent approvals are given from the ethical committee in Ibn Sina National College of Medical Sciences in April of 2019 which permitted us to start the research. We collected a total of (n = 282) data from the online questionnaire and transferred the results onto Excel for mac version 15.11.2 which will be transferred into SPSS version 20 for analysis of the data. The results

were presented as counts and percentages. Independent sample t-tests were used as a test of significance and differences; results were considered significant at P-value less than 0.05. MRI pictures were also taken from patients with ACL injuries from Al-Jedanni Hospital in a form of CD.

## Results

The tables given below illustrate the spread of anterior cruciate ligament injuries amongst the Saudi community, a study done based upon the cases discovered and reported in the year 2019 amongst a certain criteria of people (n = 74). Table 1 shows the Characteristics of responders with cruciate ligament injury, the age group varied between the ages of 46-50 years-old with the mean of the ages (Standard Deviation)  $38.0 \pm 12.2$  years. The majority of the cases studied where males with a percentage of (91.9%) and a female percentage of (8.1%). In Table 1 we have also observed that (89.2%) of the people practice sports in comparison to (10.8%) that responded to "No" in whether or not they practice sports. Table 2 shows the Characteristics of responders with anterior cruciate ligament injuries regarding the affected site and the type of ligament injured. The incidence of the affected knee side was (51.4%) for the right leg and (35.1%) for the left leg. The prevalence of both legs being injured was (13.5%). The next question was to know what type of Knee ligament was injured and the results revealed that the percentage of Anterior Cruciate Ligament injuries was (55.4%) and (8.1%) for the posterior cruciate ligament injuries, in addition to that the percentage of medial collateral ligament injuries have existed at (27.0%) and the lateral collateral ligament injuries have existed at (9.5%). Table 2 also revealed that the type of cruciate injury was (68.9%) for the partial tear and (31.1%) for the complete tear. Table 3, revealed the different characteristics of treatment that was illustrated as surgical (48.6%) in comparison with physiotherapy which showed a larger percentages reached (51.4%). The table also revealed the duration of healing amongst those who had ligament injury it shows that the

**Table 1:** Characteristics of responders with Cruciate Ligament Injury, Saudi Arabia (N = 74).

Characteristics	Frequency (No.)	Percent (%)
<b>Gender of the Injured</b>		
Male	68	91.9%
Female	6	8.1%
<b>Age</b>		
Range	46-50	
Mean (Std. Deviation)	$38.0 \pm 12.2$	
<b>Do you practice sports?</b>		
Yes	66	89.2
No	8	10.8

**Table 2:** Characteristics of Cruciate Ligament Injury among the Saudi Community in Saudi Arabia, Jeddah (N = 74).

Characteristics	Frequency (No.)	Percent (%)
<b>Affected Knee Side</b>		
Right	38	51.4
Left	26	35.1
Both	10	13.5
<b>Knee Ligament Injured</b>		
Anterior Cruciate Ligament	41	55.4
Posterior Cruciate Ligament	6	8.1
Medial Collateral Ligament	20	27.0
Lateral Collateral Ligament	7	9.5
<b>Type of Cruciate Ligament Injury</b>		
Partial	51	68.9
Complete	23	31.1

**Table 3:** Characteristics of treatment of Cruciate Ligament Injury among the Saudi Community in Saudi Arabia, Jeddah (N = 74).

Type of Treatment	Frequency (No.)	Percent (%)
Surgical	36	48.6
Physiotherapy	38	51.4
<b>Duration of Healing Time</b>		
Less than 3 months	21	28.4
3-6 months	8	10.8
More than 6 months	45	60.8
<b>Was Sports Practiced After Injury</b>		
Yes	52	70.3
No	22	29.7

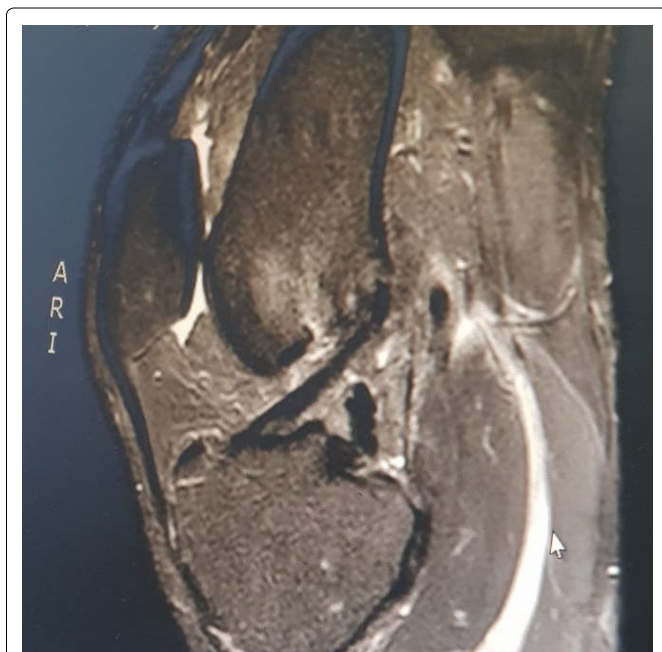
**Table 4:** Relationship between outcome of treatment and type of cruciate ligament tear, side of Cruciate Ligament and managements used among the Saudi Community in Saudi Arabia, Jeddah.

		Healing Time			Total (n = 74)	P value
		Less than 3 months (n = 21)	3-6 months (n = 8)	More than 6 months (n = 45)		
<b>Side of Injured knee</b>	<b>Right</b>	13	3	22	38	0.17
		61.9%	37.5%	48.9%	51.4%	
	<b>Left</b>	7	5	14	26	
		33.3%	62.5%	31.3%	35.1%	
	<b>Both</b>	1	0	9	10	
		4.8%	0.0%	20.0%	13.5%	
<b>Type of Tear</b>	<b>Partial</b>	19	7	25	51	0.008
		90.5%	87.5%	55.6%	68.9%	
	<b>Complete</b>	2	1	20	23	
		9.5%	12.5%	44.4%	31.1%	
<b>Management Used</b>	<b>Surgery</b>	3	3	30	36	0.000
		14.3%	37.5%	66.7%	48.6%	
	<b>Physiotherapy</b>	18	5	15	38	
		85.7%	62.5%	33.3%	51.4%	

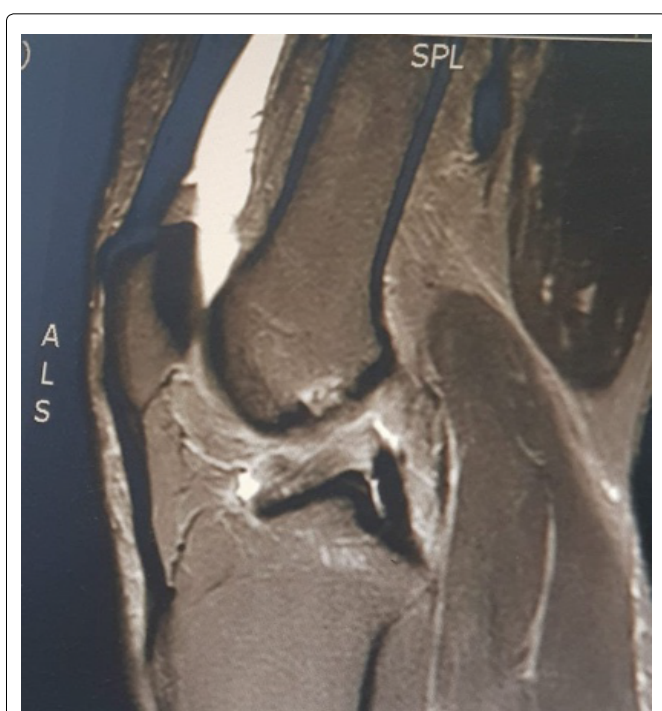
healing time less than 3 months has a percentage or (28.4%), and healing time within 3-6 months has a

percentage of (10.8%) and duration of healing more than 6 months has a percentage of (60.8%) which has

the highest value among all. In addition, the last question is was sports practiced after the injury revealed that (70.3%) answered 'yes' they do practice sport after the injury while (29.7%) answered by 'No' they don't practice sport after the injury. Table 4, unveiled the relationship between the outcome of treatment and the type of cruciate ligament tear, side of cruciate ligament and the management used among the Saudi community in Saudi Arabia Jeddah. The results revealed that the (P value) was insignificant in all cases with ( $p < 0.05$ ). All in all, there is no significant relationship between healing time and injured side. Significantly less time is taken for partial tear to heal



**Figure 1:** Anterior Cruciate Ligament shows mild edema at tibial attachment.



**Figure 2:** Shows complete torn Anterior Cruciate Ligament.

whereas complete tear takes more time for healing. Figure 1, Anterior Cruciate Ligament shows mild edema at tibial attachment. Figure 2, shows complete torn Anterior Cruciate Ligament.

## Discussion

This is a cross sectional study conducted among the Saudi Community in Jeddah City, Saudi Arabia. The study aimed to assess the prevalence of anterior cruciate ligament injuries and their association with different types of injuries, among the Saudi Community. The study showed that (n = 74) people out of 282 studied are injured in the cruciate ligaments, most injuries were in the anterior cruciate ligament by (55.4%), and (8.6%) for Posterior Cruciate Ligament, on the other hand Medial Collateral Ligament showed (27.0%), while Lateral Collateral Ligament showed (9.5%). In contrary another study done showed (63.6%) for anterior cruciate ligaments injury, and (21.5%) for posterior cruciate ligament injury and those had both side injury showed (18.3%) [13]. Another study showed most of the injuries occurred in the anterior cruciate ligaments by (60%) , and (10%) for the posterior cruciate while (30%) don't know the type of ligament injured [14]. The anterior cruciate ligament (ACL) is the most commonly injured knee ligament compared with other types of ligament injuries, as stated by many studies. Alshewaier [15], illustrated that the prevalence of ACL injury in Riyadh is 31 per 100,000 individuals, Alshewaier also stated that the ACL injury is the most prevailing knee-related injury with (53%). The PCL injuries are less common and they are often unrecognized with (15.3%) in a retrospective study [16]. In the present study, we have observed that right knee has greater rate of injury with (51%) while the left knee reported (35%) of the study samples. Furthermore, injury of both knees showed lower incidence about (13%). Regarding to the type of cruciate ligament injury we demonstrated that the partial injury was predominant in about (69%) whilst complete injury occurred in (31%) of the cases. On the other hand, we realized that different patterns of cruciate ligament injury were reported by other studies. For example, the incidence of PCL injury was about (30%) and the complete cruciate ligament injury was about (42%) [17]. La Prade 2007, reported high incidences of complete injury reached to (81.3%), and lower incidence for partial injury of (12.7%). In this study the cases were managed by physiotherapy and surgery. Surgical treatment rate (48.6%) and physical therapy rate (51.4%). On the contrary another study found that the cases were treated by physical therapy is (37.6%), surgery is (14.1%), and the combination of physical therapy and surgery showed (39.7%) [18]. As regarding to duration of treatment, less than 3 months in about (90.6%) for partial injury whilst in complete injury found in (9.5%) of the cases. As regards outcome of treatment, this study reported

that (70.3%) of the cases return to sports practiced after injury, and (29.7%) do not return to sports practiced. Based on the type of treatment and healing, Nordenvall R [10], reported that the common type of treatment for cruciate ligament injury was a non-operative treatment with (61%) of the cases followed by operative treatment with (39%) of the cases, according to the outcome of treatment, this study reported that (74.6%) of cases became good and stable, although (23.9%) still complaining and (1.4%) suffering from disability.

## Conclusion

This research is about Anterior Cruciate Ligaments injury and other ligament injury among the Saudi community in Jeddah City. It was reported that (91.9%) of the participants were males. The right knee was more affected in about (51.4%) of the cases. Majority of the Injured ligament was the ACL was (55.4%) and lateral collateral ligament being the least with (9.5%). In terms of treatment (51.4%) of the cases have undergone physiotherapy, while (48.6%) of the cases have undergone surgical treatment. No significant relationship between healing time and side of injured knee. Significantly, less time taken for partial tear to heal whereas the complete tear takes more time for healing. It is significantly showing that management with surgery take longer time compared to management with physiotherapy.

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## Statement of Equal Author's Contribution

Salah Eldeen Dafalla: Reviewed the manuscript, reviewed survey questions, conducting review of literature.

Yumna Abdulmalek Bokhari: Writing research proposal, conducting review of literature, collecting the research data, entering the research data, drafting publication manuscript.

Rowaid Sohail Yazbik: Writing research proposal, conducting review of literature, collecting the research data, drafting publication manuscript.

Assmaa Shaker Ali: Writing research proposal, conducting review of literature, collecting the research data, drafting publication manuscript.

Khamrunissa Hussain Sheikh: Analyzed the research data.

Abdullah Riyad Ali Alnaggar: Writing research proposal, conducting review of literature, drafting publication manuscript.

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