

A Case Study on Anterior Cruciate Ligament Injuries in PERSIS Surakarta Football Club

Omar Mohammed Omer Abdu Allah¹, Awatif Ali khalifa²

¹ The higher institute of sciences and technology, Mezdah, Libya

² The higher institute of sciences and technology, Mezdah, Libya

¹ omaralbasbas@yahoo.com

² amran8294@gmail.com

ABSTRACT

This study aims to explore critical aspects of anterior cruciate ligament (ACL) injuries within the context of Surakarta football club "PERSIS." Specifically, it seeks to investigate the causes of ACL injuries among players, analyze the medical treatment and rehabilitation processes employed, and provide knowledge on preventive measures to avoid such injuries.

The findings reveal that ACL injuries in the club are primarily caused by sudden stops and jumping movements, such as those involved in heading the ball. These abrupt actions can compromise the ligament's stability, which cannot adequately support the body's mass and maintain proper knee positioning during these high-intensity movements.

In terms of medical treatment and rehabilitation, injured players initially receive first aid, including the application of ice packs to reduce pain and swelling, compression bandaging, and elevation of the leg above chest level to manage inflammation. Following this, players are transported to a hospital for further medical treatment. In some cases, bracing is used to stabilize the knee without surgery.

Preventive measures emphasize proper training programs that include warm-ups, stretching, and exercises such as controlled jumping techniques to promote safer landings. The use of protective equipment and structured training routines also play a significant role in reducing the risk of ligament injuries.

This study underscores that ACL injuries often result from improper movements and a lack of awareness regarding their prevention. It highlights the need for enhanced education and training to mitigate these injuries and ensure the well-being and performance of players.

Keywords: *Cruciate Ligament, Injury Prevention, Rehabilitation, Soccer Players, Medical Treatment.*

1. Introduction

The anterior cruciate ligament (ACL) is an important topic of study in sports medicine due to its relatively high incidence among athletes. Isolated ACL tears are estimated to occur at a rate of 30 per 100,000 individuals annually (Tree et al., 2009, p. 2). The primary aim of ACL research is to explore strategies for prevention and management, reducing the prevalence and impact of these injuries among athletes. Such studies play a critical role in understanding the anatomy of the ACL, analyzing the causes of injuries, and investigating both nonsurgical and surgical management options. These findings are invaluable for sports medicine physicians, orthopedists, and other healthcare professionals in developing effective treatment and rehabilitation protocols.

ACL injuries are associated with significant negative outcomes, such as pain, effusion, inflammation, muscle atrophy, and joint instability. These effects can lead to immobility and, in severe cases, career-ending injuries for athletes or long-term disability for individuals. Football, in particular, carries a high risk for ACL injuries due to its demanding physical activities, including jumping, pivoting, twisting, and turning. These movements place

considerable strain on the knee, increasing the likelihood of ligament damage, especially when combined with the physical impacts common in the sport.

This study builds upon prior research by focusing on ACL injuries in football, emphasizing understanding the anatomy of the ligament, identifying causes of injury, and exploring effective prevention strategies. Additionally, this research aims to provide actionable insights into managing ACL injuries and minimizing their impact on athletes' performance and quality of life.

2. Research Problem

Anterior Cruciate Ligament (ACL) injuries are a common and severe issue in soccer, leading to significant physical, psychological, and career-related consequences for athletes. In the Surakarta Football Club "PERSIS," the lack of awareness about proper prevention techniques, inadequate understanding of ACL anatomy and injury mechanisms, and insufficient rehabilitation strategies contribute to a high incidence of such injuries. This study seeks to investigate the primary causes of ACL injuries, analyze the effectiveness of current medical and rehabilitation practices, and explore preventative measures to reduce the occurrence and impact of these injuries within the club.

3. Research questions

1. What are the main causes of ACL injuries in the Surakarta Football Club "PERSIS"?
2. What are the current medical treatments and rehabilitation methods used for ACL injuries in the club?
3. What preventative measures can be taken to avoid ACL injuries among the players?

3. Aim of the study

This study aims to investigate the causes, treatment, and prevention of Anterior Cruciate Ligament (ACL) injuries among players in the Surakarta Football Club "PERSIS," to provide actionable recommendations to minimize these injuries and enhance player safety and performance.

4. Objectives of the study

1. To identify the primary causes of ACL injuries in the Surakarta Football Club "PERSIS."
2. To analyze the current medical treatments and rehabilitation strategies used for ACL injuries in the club and assess their effectiveness.
3. To propose preventative measures and training programs to reduce the occurrence of ACL injuries among the players.

5. Literature Review

The anterior cruciate ligament (ACL) is a critical component of knee stability, preventing excessive forward motion and rotational instability. ACL injuries are prevalent in sports, particularly those involving jumping, pivoting, and rapid directional changes (Tree et al., 2009). The high incidence of ACL injuries in soccer highlights the need for effective prevention and rehabilitation strategies.

Previous studies have extensively examined ACL injuries and their management. For instance, Tree (2009, p. 1) evaluated rehabilitation protocols following ACL reconstruction, providing evidence on the effectiveness of exercises in helping patients return to pre-injury levels of activity. Similarly, Siegel et al. (2012, p. 1) highlighted the higher incidence of ACL injuries among women due to anatomical differences and discussed both surgical and nonsurgical management approaches. These studies emphasize the importance of educating athletes, sports personnel, and healthcare providers on the prevention and management of ACL injuries.

5.1 Epidemiology of ACL Injuries in Soccer

Soccer players are at significant risk for ACL injuries because the sport inherently involves dynamic and high-impact movements that place considerable strain on the knee joint. Activities such as sudden stops, rapid changes in direction, and aerial challenges are integral to soccer and frequently test the limits of knee stability. These actions

demand a high level of coordination, balance, and strength, but they also increase the potential for injury when performed repetitively or under unfavorable conditions, such as fatigue or uneven playing surfaces.

Biomechanically, the nature of landing, pivoting, and deceleration in soccer creates substantial forces on the knee. For example, when a player lands awkwardly after a jump or decelerates suddenly to change direction, the anterior cruciate ligament is often subjected to excessive stress, sometimes beyond its tolerance (Olsen et al., 2004). This can result in either partial or complete ligament tears, depending on the severity of the force applied. Additionally, these movements can become more hazardous when combined with physical contact from opposing players during tackles or aerial challenges, further increasing the likelihood of ligament overload and injury.

The high rate of ACL injuries in soccer is also influenced by factors such as improper technique, inadequate conditioning, or insufficient warm-up routines. These factors can exacerbate the biomechanical demands placed on the knee during gameplay, making the ligament more susceptible to injury. Overall, the dynamic and physically demanding nature of soccer underscores the need for targeted prevention strategies to reduce the occurrence of ACL injuries among players.

5.2 Causes and Risk Factors

The primary causes of ACL injuries can be attributed to a combination of improper movement mechanics, insufficient muscular support, and the inability of the body to effectively manage high-impact forces. Among these, improper landing techniques are particularly significant, as they often result in uneven distribution of force across the knee joint. When athletes land with inadequate knee flexion or poor alignment, the anterior cruciate ligament is subjected to excessive stress, increasing the likelihood of injury. Abrupt deceleration, such as when stopping suddenly or changing direction quickly, is another major factor. These movements place immense strain on the knee, especially if the surrounding musculature is not adequately conditioned to stabilize the joint.

Myer (2004) highlighted the critical role of eccentric quadriceps action in ACL disruptions, emphasizing how insufficient knee flexion during such actions can lead to greater strain on the ligament. Eccentric muscle contractions, where the quadriceps lengthen under tension, are particularly demanding on the knee. When the quadriceps fail to work in harmony with the hamstrings and other stabilizing muscles, the imbalance increases the load borne by the ACL, making it more prone to injury.

Additionally, biomechanical studies have identified knee valgus torque, a condition where the knee collapses inward during movement, as a significant contributor to ACL injuries. This inward collapse is often linked to improper neuromuscular coordination, where the muscles surrounding the knee fail to activate in a synchronized manner. Poor neuromuscular control not only compromises joint stability but also magnifies the impact of high-risk movements, such as pivoting or landing from a jump. Together, these factors create a perfect storm for ACL injuries, underscoring the importance of proper training, conditioning, and technique to mitigate these risks.

5.3 Management of ACL Injuries

Management strategies for ACL injuries are broadly classified into non-surgical and surgical interventions, each tailored to the severity of the injury and the patient's activity level. Non-surgical treatments are generally recommended for individuals with lower physical demands or for those who do not engage in activities that heavily strain the knee. These treatments primarily focus on physical therapy programs that aim to strengthen the surrounding muscles, particularly the quadriceps and hamstrings, to compensate for the compromised function of the ligament (Siegel et al., 2012). The goal is to restore joint stability and functionality while minimizing the risk of further injury. Rehabilitation programs typically include controlled exercises that target neuromuscular stability, improve muscle coordination, and enhance proprioception. These exercises are carefully structured to gradually restore the knee's strength and range of motion without overloading the joint.

On the other hand, surgical interventions are often recommended for individuals who experience frequent knee instability or have high physical demands, such as athletes. Surgical management usually involves the reconstruction of the damaged ligament using grafts, which may be harvested from the patient's own body (autografts) or from a donor (allografts). The reconstruction procedure aims to restore the structural integrity of the knee, allowing patients to regain their pre-injury activity levels. Following surgery, rigorous and well-structured rehabilitation programs are

crucial to the recovery process. These programs are designed to progressively improve functional strength, mobility, and overall knee stability. The long-term success of ACL surgeries is highly dependent on strict adherence to post-operative rehabilitation protocols, which include a combination of physical therapy, strength training, and neuromuscular re-education (Wilk et al., 2012). These efforts ensure optimal recovery and reduce the likelihood of re-injury, enabling patients to safely return to their desired activities.

5.4 Rehabilitation Strategies

Effective rehabilitation for ACL injuries prioritizes the restoration of knee strength, coordination, and functional capacity to ensure a return to pre-injury activity levels while minimizing the risk of re-injury. Central to this process are targeted exercises designed to enhance both muscle strength and neuromuscular control, which are essential for stabilizing the knee during dynamic movements. Plyometric training, which involves explosive, high-intensity movements such as jumping and bounding, is particularly effective in improving motor unit recruitment. This type of training not only strengthens the muscles around the knee but also enhances their responsiveness to sudden changes in force and direction, which are common in sports and everyday activities.

Neuromuscular training, on the other hand, focuses on refining the communication between the nervous system and the muscles to improve joint stability and movement efficiency. Exercises in this category often include balance training, agility drills, and proprioceptive activities that help patients regain confidence in their ability to control knee movements. Together, these training modalities address deficits in strength and coordination that may persist after an ACL injury.

Moksnes et al. (2013) emphasized the importance of structured rehabilitation programs tailored to the individual needs of each patient. Such programs consider factors like the severity of the injury, the patient's baseline functional capacity, and their long-term activity goals. When rehabilitation is customized and systematically implemented, it not only facilitates the recovery process but also significantly reduces the risk of re-injury. This individualized approach ensures that patients regain the necessary strength, stability, and functional capacity to safely return to their desired level of physical activity.

5.5 Prevention of ACL Injuries

Prevention programs for ACL injuries focus on a multi-faceted approach that combines physical conditioning, technique refinement, and education to mitigate risk factors. Central to these programs are strengthening exercises designed to improve the muscular support around the knee, particularly the quadriceps and hamstrings. Balanced strength between these muscle groups is critical for minimizing knee valgus, the inward collapse of the knee joint, which is a key contributor to ACL injuries. Proper warm-up routines are another vital component, as they prepare the muscles and joints for the physical demands of sports, reducing the likelihood of strain or improper movement patterns during high-impact activities.

Neuromuscular training is a cornerstone of effective prevention programs. By targeting motor control and movement efficiency, this training addresses deficiencies in coordination and joint stability. Exercises often include plyometric, balance drills, and agility work, all of which train the body to respond more effectively to the dynamic stresses of athletic movements. Breen (2013) highlights the importance of incorporating these elements into prevention programs, emphasizing their role in reducing knee valgus and enhancing overall stability, especially during high-risk actions such as jumping, landing, and pivoting.

Preventive strategies extend beyond physical training to include the use of protective gear, such as knee braces, which can provide additional support during high-intensity activities. Adherence to sports-specific guidelines, such as proper technique for landing and deceleration, is equally important in reducing injury risk. Furthermore, educating players, coaches, and sports personnel about the risks of ACL injuries and the value of preventive measures is crucial. This education fosters a proactive approach to injury prevention, promoting long-term knee health and ensuring sustainable athletic performance. By integrating these strategies into regular training routines, athletes can significantly lower their risk of ACL injuries while maintaining peak performance levels.

6. Research Methodology

This research uses the qualitative method because this research emphasizes describing the ACL injury such as the causes of ACL injury in the football club in Surakarta football club "PERSIS", the medical treatment and rehabilitation for ACL injury in the football club in Surakarta football club "PERSIS", and the prevention activity to avoid ACL injury. The design of this research is a case study that concerns on a clear description of the certain phenomena analyzed. The researchers describe the result of the research through the description and clear explanation based on what the researchers collect from the data and its experiences. The case study research focuses on the description of the group or individual people as the target of the investigation. The qualitative data gathered from this case study is the football player, the coach, the medical officer, and the documentation in the player's historical injury experience.

In this research, the researchers observed the prevention of ACL injury activity. They are observed directly in the field during the exercise as the objective data. Then, the source can also be taken from the place where the research was conducted and the environment around the club, related to the medical facilities to prevent injury and rehabilitation. Besides, the player and coach observation is focused on the instructions done by the coach and what the player does in every step of exercise activities, besides the description of behavior as it occurs naturally. The informant to explore the information about the activity in the exercise process specially to prevent the injury, and gain the player's knowledge, ask the coach to develop ACL injury knowledge, and to the medical officers to get the data related to the treatment of ACL injury. Therefore, in this study, the researchers adopt semi-structured interviews. It is used because it gives freedom to interview while the researchers can also get in-depth information on the ACL injury, the cause, the prevention, and the rehabilitation. This documentation includes the historical medical notes of the player's injury, the curriculum vitae of the player, and the lesson plan of the coach in exercise.

In this research, the researchers used the type of triangulation namely methodological triangulation to make sure that the results of the study are valid or based on the truth. Then, the researchers used an inductive approach that is intended to clarify the data reduction process by describing a set of procedures for creating meaning in complex data through the development of summary themes or categories from the raw data. this analysis is an investigation that attempts to describe accurately and factually a phenomenon, subject or area using a particular set of facts or ideas to form a description related to the research problem. In this study, the inductive approach is done through the step of the data analyzing technique adopted by Miles and Huberman (in Thomas, 2006: 239).

7. Results

7.1 Causes of ACL Injuries

The study found that ACL injuries in the Surakarta Football Club "PERSIS" predominantly occur as a result of sudden stops, rapid directional changes, improper landing techniques, and direct player-to-player collisions during high-intensity gameplay. These movements place significant strain on the knee joint, often pushing the anterior cruciate ligament beyond its functional capacity. Such high-risk activities are inherent to football and are further intensified when players perform them without sufficient preparation or proper technique.

In many cases, these factors are compounded by inadequate training on safe movement mechanics, such as proper deceleration, controlled landings, and body alignment during dynamic actions. A lack of emphasis on neuromuscular training in regular conditioning routines leaves players more vulnerable to injuries caused by abrupt movements or collisions. Additionally, the absence of comprehensive awareness programs about the risks and prevention of ACL injuries means players are less likely to recognize early warning signs or adopt protective measures. These shortcomings highlight the critical need for targeted interventions to address both technical skills and injury prevention awareness in football training programs.

7.2 Medical Treatments and Rehabilitation

Players with ACL injuries typically receive immediate care aimed at minimizing pain, reducing swelling, and stabilizing the knee joint. This initial treatment often involves the application of ice compression to control inflammation, elevation of the injured leg to decrease swelling, and the use of bracing to provide temporary stability and prevent further damage. These measures are essential for managing the injury in its acute phase and preparing the player for subsequent medical evaluation and treatment.

Rehabilitation programs for ACL injuries are designed to restore knee function and enable a safe return to physical activity. These programs focus on strengthening the surrounding muscles, particularly the quadriceps and hamstrings, to compensate for the ligament's compromised function. Exercises that improve neuromuscular control and proprioception are integral to these programs, helping players regain confidence in their knee stability and movement coordination. Additionally, functional movement training is incorporated to ensure that players can perform sport-specific activities, such as running, pivoting, and jumping, without risking re-injury.

Despite these efforts, the study highlighted significant gaps in the implementation of personalized rehabilitation plans. In many cases, rehabilitation programs were not sufficiently tailored to the individual needs of the players, potentially limiting their effectiveness. Furthermore, a lack of consistent follow-up and monitoring of players' progress was noted, which can hinder recovery and increase the risk of complications or re-injury. These findings underscore the importance of developing customized, well-supervised rehabilitation protocols to optimize recovery outcomes for players with ACL injuries.

7.3 Preventative Measures

Effective injury prevention strategies were closely tied to the implementation of structured training programs that prioritize physical preparation and movement safety. These programs emphasize warm-up routines to prepare the muscles and joints for activity, stretching exercises to improve flexibility and reduce strain on the ligaments, and neuromuscular training to enhance coordination and stability. By targeting these areas, such programs aim to strengthen the knee's supporting muscles, improve proprioception, and reduce the biomechanical risks associated with high-impact sports movements.

Specific drills designed to teach and reinforce safe jumping and landing techniques were particularly effective in minimizing the risk of ACL injuries. These drills help players develop proper alignment, control, and impact absorption during movements that place significant stress on the knee joint, such as jumping, pivoting, and rapid deceleration. These exercises are especially important in sports like football, where dynamic and unpredictable movements are common.

However, the study identified persistent challenges in injury prevention efforts. One significant issue was the inconsistent implementation of these training programs across teams, leading to uneven levels of protection among players. Additionally, a lack of comprehensive education for both players and coaches about ACL injuries and their prevention limited the overall effectiveness of these strategies. Many players were unaware of the importance of preventative measures, and coaches often lacked the knowledge or resources to enforce them consistently. Addressing these gaps through better training resources, education initiatives, and standardized implementation practices could significantly enhance the effectiveness of ACL injury prevention programs.

7.4 Player Awareness and Training

A significant gap in awareness was observed among players and coaching staff regarding the anatomy of the anterior cruciate ligament (ACL), the mechanisms underlying ACL injuries, and effective preventative strategies. This lack of understanding not only limits the ability of individuals to recognize early signs of potential injury but also hinders the adoption of proactive measures to mitigate risk.

For players, insufficient knowledge about the ACL and its critical role in knee stability often leads to improper movement mechanics, such as poor landing techniques or inadequate attention to body alignment during high-intensity activities. Similarly, coaching staff, who are pivotal in designing training programs and ensuring player safety, frequently lack the necessary expertise to incorporate evidence-based injury prevention strategies into their routines.

Education emerged as a fundamental area for improvement. Providing targeted training sessions and workshops focused on ACL anatomy, injury mechanisms, and preventative techniques can empower players to make safer choices during gameplay and improve coaches' ability to design effective training regimens. Topics such as proper warm-up routines, strengthening exercises, and safe movement practices should be emphasized to build a culture of injury prevention. Addressing this gap through structured education programs would significantly enhance the

overall understanding and application of preventative measures, reducing the prevalence and impact of ACL injuries in sports.

7.5 Role of Protective Equipment

The use of knee braces and other protective equipment has been shown to offer valuable support during recovery from ACL injuries, helping to stabilize the knee joint and reduce the risk of reinjury. These devices work by limiting excessive movement, providing compression, and enhancing proprioception, which can be especially beneficial during the early stages of rehabilitation when the knee is most vulnerable. Protective equipment can also instill confidence in injured players, allowing them to gradually resume physical activity without fear of aggravating the injury.

Despite these benefits, the study revealed that the use of such equipment is not standardized or consistently enforced within the club. Players often lack guidance on when and how to use knee braces effectively, leading to inconsistent application of this protective measure. In some cases, players may choose not to use braces due to discomfort, a lack of understanding of their importance, or misconceptions about their impact on performance.

This inconsistency highlights the need for clear guidelines and protocols regarding the use of protective equipment. Standardizing their application as part of the club's injury management and prevention strategy would ensure that all players benefit from the added protection these tools provide. Additionally, educating players and coaching staff about the proper use and advantages of knee braces could increase compliance and improve outcomes during both recovery and gameplay.

These results underscore the need for a comprehensive approach to ACL injury management, including better education, improved training programs, and enhanced medical care.

8. Discussion of the results

8.1 The causes of ACL injury in the football club

The cause of ligament injury in the football club PERSIS Surakarta, from the result of data presentation, the player got the injury caused by sudden rapidly stop and jump to head the ball, continued by direct body contact player-to-player contact. From this condition, it can cause the injury of ligament. According to Myer (2004: 362) explains the example of the cause of ACL injury include a soccer player who must rapidly stop and jump. Besides, it is also empowered by the result of study conducted by Olsen et al. (2004: 1011) that the result of the study shows in a landing or stopping move with increasing knee flexion, quadriceps muscle action was probably eccentric. Thus, it may be hypothesized that vigorous, eccentric quadriceps muscle action may play an important role in disruption of the ACL. It can be analyzed that rapidly stop cause improper or unbalanced limb in any step of the jump sequence makes the jump difficult to execute and at the time of injury, the body's center of mass is usually behind and away from the base of support; the knee is most commonly in full extension or close to full extension. In other word, it is called as one-step-stop landing with the knee hyper-extended. It is resulted when the leg abruptly stops while in an over-straightened position. Logically, the anterior ligament crosses each other to form an "X" with the anterior cruciate ligament in front and the posterior cruciate ligament in back. The cruciate ligaments control the back and forth motion of the knee. The anterior cruciate ligament runs diagonally in the middle of the knee. It prevents the tibia from sliding out in front of the femur, as well as provides rotational stability to the knee. In this condition of ACL, the position of ligament cannot hold back properly the mass of the body and its knee position. Therefore, it can cause the sprain in which the cause an injury to a joint where two bones are connected in the body by a sudden movement.

8.2 The medical treatment and rehabilitation for ACL injury

From the data presentation, it can be analyzed that the medical treatment and rehabilitation for ligament injury in PERSIS football club that the player immediately compressed by ice or ice pack on the knee to reduce pain. Then, wrap for compression around the knee, and lying down with the leg elevated higher than the level of the chest to reduce swelling. Then, he was taken to hospital to get medical treatment. Due to non surgical operation of ACL injury, the player gets the brace to wrap the knee stable and for the routine exercise, the player got form the therapist

to restore the muscle strength. It is supported by the explanation of Siegel, et al. (2012: 351) that individuals who get conservative treatment from the ACL injury but not surgical treatment, physical therapy with an experienced physical therapist or athletic trainer aimed at strengthening the muscles around the knee, especially the quadriceps femur and hamstring muscles, is pursued.

The conservative treatment is executed for the patients who suffer particular disease that force them not getting surgical treatment. The nonsurgical treatment can be done by physical therapist which is executed by the experienced therapist. Then, the treatment is focused on the therapy for rehabilitation program that is emphasizing hamstrings muscles and strengthening greater than quadriceps muscles strengthening and fitted with and extension-limiting brace for use during strenuous activities

Bracing is another way of stabilizing the knee without surgery and there are purpose made ACL braces which protect the joint and can be very valuable during certain sports. From the treatment from this football club, the use of brace is useful if these are the occasions that the knee tends to give out. Wearing a brace does not appear to weaken the knee. Buss, et al. (1995: 161) explain that during the acute injury phase, patients are treated symptomatically with a knee immobilizer and weight bearings tolerated with crutches initially.

The rehabilitation program emphasizing hamstrings muscles and strengthening greater than quadriceps muscles strengthening and fitted with and extension-limiting brace for use during strenuous activities. Therefore, the player who get ligament injury wearing brace to wrap the knee stable and to help them to exercise from therapist to restore the muscle strength. Wearing a knee brace can help reinjury. The main effect of a knee brace is to be a constant reminder to be careful. However, a brace will not completely stabilize a knee.

Furthermore, for the rehabilitation, the player got the special exercise from the therapist. The player also gets the light exercise. Exercises that restore the muscle strength, power, coordination, and endurance will also improve knee function. It is supported by the explanation of Moksnes, et al. (2013: 6) explains in detail the rehabilitation program implemented in the study was based on the principle that training for immature children should be safe, effective and enjoyable. The rehabilitation was directed towards challenging neuromuscular knee stabilizing strategies and plyometric exercises.

The intention was to facilitate increased motor unit activation and changes in motor unit coordination, recruitment and firing. The observed improvements in muscle strength, and the symmetrical results of single-legged hop tests, indicate that the rehabilitation was adequate to facilitate adequate neuromuscular strategies. It can be analyzed that the rehabilitation of the patient is done the restore the muscle power by continuing the strengthening exercises, routine neuromuscular control drills, routine plyometric drills, light progress running and mentally and physically program. The purpose of this rehabilitation is to normalize strength of knee muscle, enhance muscular power and endurance, improve neuromuscular control, and analyze the appropriate selected sport-specific drills to restore the knee muscle.

The rehabilitation of this patient is supported by the result of study conducted by Wilk, et al. (2012: 154) that the patient is instructed to lie supine while the low-load, long-duration stretch is applied for 12 to 15 minutes 4 times per day, with the total low-load, long-duration stretch time per day equaling at least 60 minutes. By utilizing this technique immediately following surgery is to maintain and improve knee extension and prevent a flexion contracture. In short, the conclusion of the rehabilitation is a program to the first post-operative exercise such as range of motion exercises, stretches, and strengthening exercises.

8.3 The prevention activity to avoid ACL injury

The prevention of ligament injury can be done by proper training including warming up and stretching as much as possible and doing them correctly. Besides, the knowledge of how to prevent ligament injury by special training such as various jumping to train them for safer landing and the cause of ligament injury is important. Besides, the use of protective equipment and training programs is helpful to prevent ligament injury. Therefore, the players can manage themselves when they play the game and they can think how to avoid and what he has to do. Breen (2013: 12) explains further that coaches and educators can however help reduce their athlete's risk of ACL injury by utilizing one of the above prevention programs and also encouraging to maintain general health and fitness: sport-specific conditioning, diet, exercise, sleep. Then, to be adequate rest and recovery between training and competition and variability in training methods from session to session and across a season.

Furthermore, discussing the prevention related to the PERSIS football club training program, the coach instructs firstly by warming up, stretching, and cooling down. Then, it is combined with running as an important activity in playing football. Warming up or stretching is designed to increase the heart rate and temperature, and stretch muscles, and joints in preparation for more playing the game activity to reduce the risks of sustaining an injury. The second, is for the exercise to prevent muscle and ligament injury, using the training program from the scheduled

lesson plan of training aimed at injury prevention. Then, it is continued by various exercises of jumping and technical exercises of playing football. Jumping straight up with no excessive side-to-side or forward-backward movement, it was focused on the goalkeeper to prevent a leg injury or ligament sprain. Then, exercise for soft landings, including toe-to-heel rocking and bent knees, it is also for the player and goalkeeper when they have to cop the ball from the air and suddenly crash into another player. Encourage him to land softly, using a toe-to-mid-foot rocker landing. The various exercises of prevention are supported by the explanation of the study conducted by Olsen, et al. (2004: 1011) explains that the exercises used have been designed to improve balance, awareness, and knee control during standing, running, cutting, jumping, or landing. In addition, some included sports-specific exercises focusing on the "knee-over-toe" position and 2-feet landing after jump shots. Then, neuromuscular training reduces dangerous valgus torques at the knee and increases the hamstring torques. Then, Moksnes, et al. (2013: 2) also supported the secondary prevention program that consists of neuromuscular and functional muscle strengthening exercises were encouraged to reduce the ACL injury.

For further discussion, the explanation above also can be discussed that prevention can be done by exercise training programs. Training programs are designed to improve the skillful player's play, strength, and technique, as well as increase understanding of injury risks and prevention strategies such as how to jump, land, or fall safely. Safety guidelines and practice are important to ensure those players to get involved in sports have the knowledge needed to participate safely and responsibly. The education of football knowledge related to injury such as ACL injury is the safety guidance or codes of practice for sports are often used to promote safe techniques. For the technical term, it relates to the way to prevent in using its tool. For the example, injuries can be prevented by making sporting equipment safer. The tools to prevent injury designed for certain sports, such as football, the use of protective equipment can reduce the risks of experiencing an injury. These are designed either to protect muscles and joints.

9. Implication and Suggestion

The results of the study about ACL injury imply that ACL injury is caused by the wrong movement of ligament due to the player's self-activity. It is due to the lack of awareness about information about ACL injury, understanding the anatomy of ACL itself and the prevention for ACL injury. Furthermore, this implication reveals the following suggestion:

9.1 For the Coach

The coach needs to improve training programs related to the knowledge of the various injuries, the proper player skill and the prevention to injury. It is to strengthen the technique, as well as increase understanding of injury risks and prevention strategies such as how to jump, land, or fall safely. The coach provides clear safety guidelines and practices that are important to ensure that players to get involved in sports have the knowledge needed to participate safely and responsibly. The education of football knowledge related to injury such as ACL injury is the safety guidance.

9.2 For the Football Player

The football player is expected to understand the technique or the skill how to prevent the injury and safety playing. It can reveal player awareness in playing and so that the player can be more carefully to play and think more about the risk of their activity in playing football. Besides, the consistency of warming up and stretching is very important to prevent the injury, ankle sprain. The technique of safety landing and safety stopping from the sprint must be improved to reveal awareness and to make skillful technique specially to prevent the ligament injury.

10. Conclusion

The study on ACL injuries in the Surakarta Football Club "PERSIS" highlights the significant impact of these injuries on players' performance and career longevity. It identifies improper techniques, inadequate awareness, and lack of preventative training as major contributors to ACL injuries. Effective medical treatments, including immediate care and rehabilitation, play a critical role in recovery but require enhancement to ensure long-term stability and functionality. The study also emphasizes the importance of preventative measures, such as proper training programs, the use of protective equipment, and education for players and coaches, to reduce the risk of ACL injuries.

The comprehensive investigation into ACL injuries within the Surakarta Football Club "PERSIS" underscores the substantial repercussions of these injuries on both player performance and career trajectory. The study pinpoints several key factors contributing to the prevalence of ACL injuries, including suboptimal techniques, limited awareness regarding injury prevention, and a deficiency in proactive training regimens.

While effective medical interventions, such as prompt care and rigorous rehabilitation, are crucial for recovery, there is a clear need for further advancements to optimize long-term joint stability and functionality. Furthermore, the study emphasizes the indispensable role of preventative measures, including well-structured training programs, the strategic utilization of protective equipment, and comprehensive education for both players and coaching staff, in minimizing the risk of ACL injuries.

By delving into these critical aspects, the study offers actionable recommendations to enhance injury prevention strategies and cultivate a safer, more sustainable athletic environment for soccer players within the club. These insights not only have the potential to benefit PERSIS but also serve as a valuable resource for other football clubs and organizations seeking to mitigate the impact of ACL injuries and promote the overall well-being of their athletes.

11. REFERENCES

- [1]. Arnason, A., et al. (2004). Physical fitness, injuries, and team performance in soccer. *Journal of Medicine & Science in Sports & Exercise*. American College of Sports Medicine.
- [2]. Boden, B. P. (2008). Anterior Cruciate Ligament (ACL) Injury Prevention. Retrieved from www.sportsmed.org.
- [3]. Breen, S. (2013). Snap! Crackle! & Pop! Anterior Cruciate Ligament Injuries in Children and Adolescents. *The Mahperd Journal*, Spring 2013. University of Limerick, Ireland.
- [4]. Buss, D. D., et al. (1995). Non-operative treatment of acute anterior cruciate ligament injuries in a selected group of patients. *The American Journal of Sports Medicine*, 23(2).
- [5]. Cohen, L., et al. (2007). *Research Methods in Education* (6th ed.). New York: Routledge.
- [6]. Dawson, C. (2009). *Introduction to Research Methods*. Oxford: How To Content. Ltd.
- [7]. Denscombe, M. (2007). *The Good Research Guide: For Small-Scale Social Research Projects* (3rd ed.). New York: McGraw-Hill Education.
- [8]. Dey, I. (2005). *Qualitative Data Analysis: A User-Friendly Guide for Social Scientists*. London: Routledge.
- [9]. Dharamsi, A., & LaBella, C. (2013). Prevention of ACL injuries in adolescent female athletes. *Contemporary Pediatrics*. Retrieved from www.modernmedicine.com.
- [10]. Frobell, R. B., et al. (2011). A randomized trial of treatment for acute anterior cruciate ligament tears. *The National Medical Journal of India*, 24(2).
- [11]. Samuelsson, K. (2009). Treatment of anterior cruciate ligament injuries with special reference to graft type and surgical technique: An assessment of randomized controlled trials. *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, 25(10), 1139–1174.
- [12]. Kvist, J. (2004). Rehabilitation following anterior cruciate ligament injury: Current recommendations for sports participation. *Sports Medicine*, 34(4), 269–280.
- [13]. Lewis, J., et al. (2003). *Qualitative Research Practice: A Guide for Social Science Students and Researchers*. London: Sage Publications Ltd.
- [14]. Mackey, A., & Gass, S. (2005). *Second Language Research: Methodology and Design*. New Jersey: Lawrence Erlbaum Associates.

- [15]. Myer, G. D. (2004). Rationale and clinical techniques for anterior cruciate ligament injury prevention among female athletes. *Journal of Athletic Training*, 39(4), 352–364. Retrieved from www.journalofathletictraining.org.
- [16]. Moksnes, H., et al. (2013). Functional outcomes following a non-operative treatment algorithm for anterior cruciate ligament injuries in skeletally immature children. *BMJ*.
- [17]. Myklebust, D., & Bahr, R. (2005). Return-to-play guidelines after anterior cruciate ligament surgery. *British Journal of Sports Medicine*, 39, 127–131. Retrieved from <http://bjsm.bmj.com>.
- [18]. Neuman, P. (2010). Anterior cruciate ligament injury: Patient variables, outcomes, and knee osteoarthritis. *Doctoral Dissertation*. Lund University, Faculty of Medicine.
- [19]. Olsen, O.-E., et al. (2004). Injury mechanisms for anterior cruciate ligament injuries in team handball: A systematic video analysis. *The American Journal of Sports Medicine*, 32(4).
- [20]. Sadoghi, P., et al. (2012). Effectiveness of anterior cruciate ligament injury prevention training programs. *The Journal of Bone and Joint Surgery*.
- [21]. Siegel, L., et al. (2012). Anterior cruciate ligament injuries: Anatomy, physiology, biomechanics, and management. *Clinical Journal of Sport Medicine*, 22(4). Retrieved from www.cjsportmed.com.
- [22]. Sports Medicine Australia. (2010). Anterior cruciate ligament injury: A guide to prevention and management. Retrieved from www.sma.org.au.
- [23]. Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, 27(2), 237–246. Retrieved from <http://aje.sagepub.com/content/27/2/237>.
- [24]. Tree, A. H., et al. (2005). Exercise for treating isolated anterior cruciate ligament injuries in adults. *Cochrane Database of Systematic Reviews*.
- [25]. Wakefield Orthopaedic Clinic. (2011). Anterior cruciate ligament injury (ACL). Retrieved from <http://www.woc.com.au>.