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Evaluation of Factors Associated with Hip Joint Injuries Among Football Players

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Abstract

Hip joint injuries have become a major leading cause of concern in modern football because of the biomechanical demands required from the players during high-intensity movement routines like sprinting, pivoting, and tackling. The study set out to determine the leading factors owing to which football players sustain injuries in the hip joint. A cross-sectional design was used involving 124 male professional players from regional clubs. After reporting their injury histories through a questionnaire, biomechanical screenings were performed on them. The data were analyzed using SPSS v26 through descriptive statistics and logistic regression analysis. It was discovered that inadequate warm-up routines, previous injuries, restricted hip range of motion, and overtraining proved to be significant correlates with the occurrence of hip injuries ($p < 0.05$). Preventive strategies should comprise individualized strength programs, flexibility training, and biomechanical assessments.

Keywords: Evaluation, Factors, Injuries and Football.Introduction

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introduction

Football (soccer) is the most widely played sport around the world that demands a sharp physical performance and also agility and coordination in a dynamic and intense game which pre-disposes the players to various types of musculoskeletal injuries. One of the significant concerns among these injuries is hip joint injuries. This will not only affect player performance but will also contribute to a long absence from playing, which in some cases can be even more critical to lead an end of career.

The hip joint is central and very mobile articulation in football-specific movements such as sprinting, kicking, cutting, and quick changes in direction. Due to its intricate anatomy and labral participation in both weight-bearing activities and the range of motion, it becomes susceptible to many injuries. These include labral tears, femoroacetabular impingement (FAI) along with muscular strains like iliopsoas or adductors and tendinopathies. As per epidemiological data, injuries of the hip and groin will together constitute around 10–18% of total injuries in professional football players.

Many internal and external causes have been linked to the happening of injuries at the hip joint. Internal causes include imbalances in biomechanics, weakness of muscles, rigidity, and a past injury record. External causes include the load about training, playing surface details footwear details and recovery periods that are not enough. The interaction of these variables requires an assessment that is complete for the purpose of developing a strategy that is effective in both prevention and rehabilitation.[1]

Despite increasing attention toward sports medicine, systematic research targeting the specific factors of hip joint injuries in football populations is still missing. A better understanding of the multifactorial nature of these

injuries will help the coach, physiotherapist, and sports medicine practitioner develop evidence-based interventions according to individual risk profiles.[2]

This study will assess the major factors linked to football players' hip joint injuries, having a detailed look at the clinical, biomechanical, and environmental variables. The identification of such links will contribute to optimizing injury prevention protocols as well as maintaining athletic health in football players over the long term.

Research Problem

Hip joint injuries pose one of the major difficulties in football owing to their high frequency, complicated diagnosis, and possibly protracted periods of rehabilitation. Although football players, both amateur and professional, are increasingly sustaining hip-related injuries, the main risk factors associated with their development do not seem to be agreed upon. The literature highlights a variety of possible determinants: biomechanical imbalances; muscle weakness; history of injury; intensity of training; and external factors like surface and equipment. None of these studies had looked into these factors holistically in the framework of hip joint injuries specifically during football activities where an anatomical as well as a functional demand is placed on the hip joint.

This piecemeal knowledge blocks the creation of focused prevention and rehabilitation programs, causing longer recovery periods and repeat injuries. Also, the lack of a complete, relevant assessment of these issues in football players limits clinicians, coaches, and sports scientists from carrying out evidence-based interventions. Hence, exploring the various causes of hip joint injuries in football—looking at both internal

and external factors—is important for reducing injury risk and improving performance.

Materials and Methods

Study Participants

Study participants included 124 male professional football players aged between 18 and 30 years from four different football clubs competing in the national league. The inclusion criteria necessitated that the players be actively playing in the last season and have no history of hip surgery .

Study Organization

Data gathering included a normal injury past note and function move check-ups using goniometry and manual muscle testing. Also, warm-up acts, training load and weekly game show were noted.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics v26 . Logistic regression was used to establish the associations between the factors and the likelihood of hip injury occurrence. The level of significance was determined at $p < 0.05$.

Results

From a total of 124 participants, 37 reported having sustained at least one injury to the hip in the previous 12 months, which made up 29.8% of the total. The most common injuries were flexor strains and labral tears. From the regression analysis done; poorly cooling down was seen as a chance factor(OR=2.9), past injury(OR=3.5), restricted ROM for hip

was seen as a role factor(OR=2.2) and excessive training loads met indicated role too(OR=1.8).

Table 1. Show factors Potentially Contributing to Hip Injuries in Athletes

Factor	Odds Ratio (OR)	p-value
Inadequate warm-up	2.9	0.012
Previous hip injury	3.5	0.001
Limited hip ROM	2.2	0.021
Overtraining (>10 hrs/wk)	1.8	0.037

Not warming up well enough is linked with an odds ratio of 2.9, and the p-value is 0.

It implies that athletes who warm up poorly before exercise are 2.9 times more likely to have a hip injury compared to those who warm up well. The result is statistically significant since the p-value is less than 0.05. This finding agrees with the literature that confirmed; a good warm-up increases flexibility, creating good circulation and reducing the chances of muscle tears or cramps.

Prior hip injury: OR = 3.5, p = 0.001 The above results indicate that a person who has had a prior hip injury now stands 3.5 times more likely to have a future injurious event, and this is indeed highly statistically significant. It falls well in line with the hypothesis that previously injured tissues do not return fully to their former elasticity or strength and thus fare worse in terms of recurrent injury.

Limited hip ROM, OR = 2.2, p = 0.021 Athletes who have limited range of motion in their hips are 2.2 times more at risk of having an injury as compared to those who do not have such limitation of range of motion, a

statistically significant finding. Reduced range of motion may lead to unnatural compensation in movements during athletic performance, placing unnatural stress on surrounding muscles and joints.[3]

Overtraining (>10 hours/week): OR = 1.8, p = 0.037 The data show that athletes who train more than 10 hours a week have a 1.8 times higher risk of getting injured. Though this finding is at the limit of statistical significance, it still gives an idea of a possible relationship between overtraining and increased risk of injury, which goes along with the notion of "overload," a common risk factor for sports injuries.[4]

Table 2. Distribution of Injury Types by Playing Position

Position	Hip Flexor Strain	Labral Tear	Tendinopathy	Total Injuries
Goalkeeper	2	1	1	4
Defender	8	4	2	14
Midfielder	13	7	5	25
Forward	6	3	2	11
Total	**29**	**15**	**10**	**54**

The table shows the numbers of hip injuries based on type (hip flexor strain, acetabular labrum tear, tendinopathy) and position played (goalkeeper, defender, midfielder, striker). From this data many key indicators can be derived:

First: Distribution of injuries by position

Midfielders had the highest total count of injuries, that is 25; hence, they contributed to 46.3% of the total injuries (25 out of 54). It shows the lively character of the midfield role that necessitates continuous physical exertion as well as quick changes in direction and regular engagement in both defending and attacking which makes hip injuries a higher risk.

Defenders came in second with 14 injuries (25.9%) probably because of the regular physical confrontations and clashes most likely when they are trying to intercept the ball or block an attack.

Forwards recorded 11 injuries (20.4%), a relatively lower rate, which may be attributed to their movements being more focused on shooting or penetrating rather than continuous contact.

Goalkeepers were the least injured group within this category (only 4 injuries, or 7.4%), which is probably expected because of the nature of their performance, which quick reaction performances rather than repetitive stress on the hip joint.[5]

Second: Distribution of Injuries by Type

The precondition of hip flexor pull was the majority with 29 injuries being recorded which is 53.7%, it reflects the major stress on hip flexors due to acceleration, sprinting, or repeated shooting. Only midfielders contributed to the hurt count with 44.8% of these injuries (13 out of 29).

Labral tears came second with 15 injuries, 27.8%. It was also observed that midfielders and fullbacks commonly sustained this type of injury; hence, rapid turning and change of direction could be the probable causes. Tendinopathy recorded the least number of injuries (only 10 injuries, or 18.5%), but it is still a significant condition due to its chronic nature which mayleist result in performance degradation.[6]

Third: Sporting Implications and Preventive Recommendations

Results pinpoint the need for position-specific training programs, especially for midfielders, that emphasize on strengthening the hip flexors and enhancing joint flexibility. Coaches and medical personnel should keep a close eye for early warning signs in midfielders and defenders so that they can promptly initiate therapeutic intervention to curb the progression of injury.

There can be improved movement strategies, balance, and biomechanics to lower hip injury risk.[7]

Table 3. Comparison of Hip ROM (Range of Motion) Between Injured and Non-Injured Players

Group	Hip Flexion (°)	Hip Extension (°)	Hip Abduction (°)	Hip Rotation (°)
Injured (n=37)	112.4 ± 5.8	17.2 ± 3.4	30.6 ± 4.5	34.8 ± 3.1
Non-injured (n=87)	118.9 ± 4.2	21.8 ± 2.9	36.7 ± 3.8	40.5 ± 2.7
p-value	0.001	0.003	0.005	0.002

Results of the present study showed statistically significant differences between injured and uninjured athletes in hip range of motion measures in flexion, extension, abduction, and rotation: all four directions. An elaborated account of these differences follows:

1. HIP FLEXION

INJURED GROUP: 112.4 ± 5.8 DEGREES UNINJURED GROUP: 118.9 ± 4.2 DEGREES p VALUE = 0.001 These results say that hurt athletes have much less flexion range set beside unhurt athletes, which might show bad flexibility or strength of the hip flexors, or limits coming from a past injury. Bad flexibility for bending can harm motor performance in sports needing a big motion, like running and jumping.[8]

2. Hip Extension Range

Injured Group: 17.2 ± 3.4 degrees

Uninjured

The results show a marked decrease in the range of extension in the hurt patients, which may point to a deficiency in the extensor muscles (like the gluteus maximus) or tightness in the flexor muscles that blocks extension. This deficiency can impair sports performance and raise the chance of re-injury, more so in games that need complete leg extension as part of the move cycle.[9]

3. Hip Abduction Range:

- Injured Group: Around 30.6 degrees, give or take 4.5

The numerical divergence between both sets of participants shows reduced talent to abduct the hip in patients who had an injury, possibly due to a pathology in the abductor muscles which includes gluteus medius. These muscles' weakness state is a confirmed predisposing condition for injuries of the lower limb, more specifically at the knee and ankle because of pelvic instabilities.[10]

4. Hip Twist Range

- Affected group: 34.8 ± 3.1 degrees
- Non-affected group: 40.5 ± 2.7 degrees
- *p-value* = 0.002 The difference in twist shows a problem in the ease or stability of the muscles that turn in and out at the hip. Bad turning control can lead to weak movement patterns and more strain on nearby joints like the knee.

Table 4. Association Between Training Load and Injury Incidence

Training Hours/Week	Players (n)	Injuries (n)	Injury Rate (%)
<6 hours	28	3	10.7%
6–8 hours	41	9	21.9%
8–10 hours	30	11	36.7%
>10 hours	25	14	56.0%

An immediate association between training hours and injury: An

incremental rise in injury rates was seen with increasing training hours, from 10.7% in the group that trained for less than 6 hours to 56.0% in the one which surpassed 10 hours per week. This indicates that overtraining could possibly be a leading cause in the high rates of injuries. Physiological factors and muscle fatigue:[11]

Injury possibilities exceed when the physical limits are crossed; this includes muscle strains as well as tears and chronic repetitive strain injuries.

Inadequate recovery periods between training sessions have previously been proven to impair the compensatory ability of the body as well as to elevate injury risk (Gabbett, 2016).

Injury rate:[12]

The sharp and substantial surge in injury rates within the 10-hour group clearly highlights the need for careful management of training intensity and provision.

Aiming training programs at the principle of gradual load progression and adding sufficient recovery times may be a way to lower injury chances.

Injury Prevention and Rehabilitation: Planning Comes First

As injuries were highly reported in the group of trainees who were subjected to intensive training, there is a dire need for warm-up, cool-down, and injury prevention exercises to be added to the training schedule along with a program that focuses muscle strengthening and balancing.

Table 5. Logistic Regression, Predictors of Hip Injury

Variable	Odds Ratio (OR)	95% CI	p-value
Previous Hip Injury	3.47	1.71 – 6.39	0.001
Inadequate Warm-Up	2.83	1.27 – 4.91	0.012
Hip ROM Deficit	2.21	1.10 – 4.18	0.021
Weekly Training >10 Hours	1.79	1.03 – 3.32	0.037

The table above helps analyze and discuss the factors related to hip injuries as indicated:[13]

١-١Prior hip injury. Odds ratio (OR): 3.47, Confidence interval (95% CI): 1.71 – 6.39

-P-value: 0.001 It means that athletes who had a hip injury became re-inners 3.47 times more likely than those who never had such an injury, a difference in risk that is statistically significant ($p < 0.01$). This finding backs up the idea that previous injury is one of the best predictors of later injury because it can hurt tissue integrity and muscle function around the joint.

٢-Inadequate Warm-Up 2. 2.83 95% CI: 1.27 – 4.91 p-value: 0.012 This factor means that the risk of a hip injury doubles and more if an individual does not perform an adequate warm-up before exercising, and this is statistically significant ($p < 0.05$) A possible explanation for these findings is that warm-up acts as a preparatory exercise which increases blood circulation and muscle temperature, thus reducing the tear or injury risk when exertion comes suddenly.

1. Hip ROM Deficit

-OR: 2.21
-95% CI: 1.10 – 4.18
-p-value: 0.021

١-A Hip ROM Deficit is associated with a two-point twenty-one times the risk of injury and it is statistically significant. This result reflects the importance of flexibility in keeping normal motor performance and proper stress distribution while engaged in sports activity, which reduces stress on the joints and surrounding muscles.

-٢Weekly Training >10 Hours OR: 1.79 95% CI: 1.03 – 3.32 p-value: 0.037 This result combines that intensive training none less than 10 hours per week is associated with a 1.79 fold increased risk of injury, which is also statistically significant. This may be explained by high

training loads, tissues stressed; hence, there is an increased risk of overuse injuries.

Conclusions

Football players' hip injuries are influenced by intrinsic factors prior injuries limited ROM and extrinsic factors warm-up quality training volume. Injuries can be controlled and athletic life prolonged with proper neuromuscular control, dynamic stretching, and workload management.

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Conflict of Interest

The authors say they don't have any conflicts of interest.

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