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Temporal and angular biomechanical analysis of the ankle joint as a basis for the prevention of external ligament tear injury in soccer players

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ABSTRACT

The aim of this research is to study the temporal biomechanical properties and kinetic angles of the ankle joint during high-risk situations in football (jumping and landing, changing direction, and physical contact), in order to identify quantitative indicators associated with the risk of external ligament tear injury.

The researcher used the descriptive-analytical method supported by a field experiment on an intentional sample of (25) players from Samarra Club, aged between (18-30) years, representing various positions. The performance was filmed using a high-resolution digital camera and motion analysis through the Kinovea software to extract the temporal variables (contact time, stability time) and angular variables (lateral deflection angle, angular velocity).

The results showed that:

• The contact time with the ground is relatively short (0.42 seconds), reflecting the shock absorption efficiency of most players.

• The angle of deflection ranged from (12°–27°), which is an indication of uneven joint control.

• The angular velocity during the change of direction was high (245°/s), which increased the load on the ligaments.

• The stabilization time after the performance ranged from (0.92–2.05 seconds), which is an indication of the players' ability to regain balance.

The research concluded that temporal and angular biomechanical analysis represents an accurate tool for classifying players according to risk levels (low-medium-high), and can form the basis for building preventive programs based on dynamic balance training, peroneal muscle strengthening, and neuromuscular control exercises.

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Introduction to the Research:

1-1 Introduction and Importance of the Research:

Ankle injuries are one of the most common injuries among soccer players, as studies indicate that ankle sprains and external ligament tears account for approximately 20% of sports injuries in high-level competitions, and often occur during jumping, landing, or sudden change of direction and physical contact, leading to prolonged absences of players and affecting athletic performance. (Buckthorpe et al., 2025, p. 214)

The problem with ankle injuries is not only their occurrence, but also their high frequency of occurrence, as a player who has suffered a previous injury becomes more likely to be injured again if it is not dealt with properly preventively, which illustrates the need for preventive programs based on a rigorous scientific analysis of movement. (Flore et al., 2024, pp. 33–34)

Temporal and angular biomechanical analysis of motion is an objective tool for understanding the mechanics of the ankle joint during high-risk situations such as jumping, landing, or changing direction. Through this analysis, quantitative variables such as contact time with the ground, and angular variables such as lateral deflection angle and rotational velocity, can be identified, which are key indicators for assessing the risk of injury.

(The Football Physio, 2024, p. 12)

Neuromuscular training programs such as FIFA 11+ have been shown to be effective in reducing ankle injuries among soccer players, improving dynamic balance, strengthening the muscles around the ankle, and enhancing neuromuscular control. However, the design of these programs must be based on accurate movement analytical data to ensure their effectiveness.Eser et al., 2024, pp. 45–46) Dynamic balance training has also proven to play an important role in the prevention of ankle injuries, as it helps to improve functional stability and reduce neuromuscular response time during sudden situations in matches.

(Tomchuk et al., 2025, p. 88)

1-2 Research Problem:

Ankle injuries, especially external ligament tears, are one of the most common injuries in football, with UEFA reporting that these injuries account for 15-20% of all injuries recorded in major tournaments, and they often occur during jumps and landings, sudden change of direction or physical contact. (Ekstrand et al., 2019, p. 112)

Although there are many treatment and preventive programs, most of them rely on general protocols that are not based on an accurate biomechanical analysis of the actual movement of the players. This leaves a clear scientific gap in understanding the relationship between kinematic variables (e.g., contact time with the ground, angle of lateral deflection, angular velocity) and the probability of ankle injury.

(Delahunt et al., 2010, pp. 45–46)

Studies also show that players who have had a previous ankle injury are up to 70% more likely to re-injury within one year if preventive programs based on scientific analysis of movement are not applied, turning the injury into a chronic condition that affects a player's athletic career.

Hence, the research problem is identified in the absence of preventive programs based on temporal and angular biomechanical analysis of the ankle joint in high-risk situations in soccer players, which increases the likelihood of injury and recurrence of external ligament tears.

1-3 Research Objectives:

- Identify high-risk situations associated with the rupture of the external ligaments of the ankle joint in soccer players.
- Identify motor performance analysis using a single camera and free software (Kinovea) to monitor the temporal and angular variables of the ankle joint during these situations.

1Practical implementation within this research.

1-4 Research Hypotheses:

1. There are statistically significant differences in the time of contact with the ground between high-risk situations (jumping and landing, changing direction, physical contact).

2. There are statistically significant differences in the angle of lateral deflection of the ankle joint between players with a history of ankle injury and those who have not suffered a previous injury.

1.5 Identification of Areas:

1.5.1 Human field: advanced Samarra FC players

1-5-2 Temporal Domain: For the period from (22/4/2025) to (2/8/2025).

1.5.3 Spatial Area: Samarra Sports Club Stadium.

2- Research methodology and field procedures:

2.1 Research Methodology:

The researcher used the descriptive-analytical method, supported by a controlled field experiment, by imaging the motor performance of the players during high-risk situations (jumping and landing, changing direction, physical friction), and analyzing the temporal and angular variables of the ankle joint using a single camera and free software, with the aim of extracting accurate quantitative indicators on which future preventive programs are based.

2.2 Research Population and Sample:

2.2.1 Research Community

The research community consists of footballers registered in the Iraqi Premier League and the First Division, as this community is the most susceptible to ankle injuries as a result of the intensity of matches and the frequency of high-risk situations.

2.2.2 Research Sample

An intentional sample was selected from 25 players from Samarra FC representing different positions (defenders, midfielders, forwards, goalkeepers), aged between 18 and 30 years, all of whom are in good physical fitness and have been free of a severe ankle injury during the last 6 weeks.

• Listing criteria: An officially registered player, capable of performing demo missions.

• Exclusion criteria: chronic ankle or knee injuries, use of therapeutic tools that alter the mechanics of movement.

The research population was selected from the second stage student at the Faculty of Physical Education and Sport Sciences, Samarra University, three study divisions for the academic year 2024-2025, which are (99), as the researcher selected the research sample consisting of (85) for the research necessities, and the failing and absent students were excluded for the homogeneity of the sample, as the sample was divided into (25) division for each of the three groups (individual experimental), (competitive experimental), (traditional control) and () students for the exploratory experiment, and Table **(2) shows the division of the sample.**

2.2.2.1 Sample homogeneity

In order to verify the suitability of the sample for biomechanical analysis, the researcher calculated the statistical homogeneity indices of the basic variables (age, height, weight, training age). The results showed that the mean and standard deviations came within the normal limits, and the coefficients of torsion and flattening were less than ±1, which indicates that the distribution of the data is close to the normal distribution. This confirms that the sample is homogeneous in terms of physical characteristics and training experience, so the differences that will emerge later can be attributed to experimental variables rather than to significant individual differences between players.

Table (1)

Sample homogeneity

N = 25

Flattening coefficient	Torsion coefficient	Standard deviation	Arithmetic mean	Unit of Measure ment	Variables
-0.41	0.35	6.1	72.5	kg	Mass
0.27	0.27	5.2	176.8	Poison	Length
0.31	0.31	2.4	22.6	Year	Age
-0.36	0.29	2.1	6.8	Year	Training Age

Table Interpretation:

• All statistical values are within the normal limits.

• The sample is homogeneous in terms of age, height, weight, and training age.

• This homogeneity enhances the credibility of the results and confirms that biomechanical analysis will reflect real differences in performance and not individual differences in basic characteristics.

2.2.2.2 Homogeneity of the sample in terms of injury

The researcher collected data on the history of ankle injuries among the sample members (25 players from Samarra Club), according to different positions (defenders, midfielders, forwards, goalkeepers) and classified them into three main categories:
• Players who have not suffered a previous ankle injury.
• Players who have suffered one ankle injury during their career.
• Players who have suffered repeated ankle injuries (more than twice).

Table (2)

Sample distribution by ankle injury date

N = 25

Recurrent injuries (≥2)	One Injury	No injury	Number of Players	Center
2	2	3	7	Defender
1	4	4	9	Medium
2	2	2	6	Attacker
1	1	1	3	Goalkeeper
6	9	10	25	Total
24%	36%	40%	100%	Percentage

The table shows that the sample members are relatively balanced between the different centers, with differences in the rates of ankle injury. The percentage of players who have not had a previous ankle injury (40%), the percentage of players who have suffered one injury (36%), and the percentage of players with recurrent injuries (24%). The distribution shows that defenders and attackers are more prone to repetitive injuries due to frequent friction and sudden changes in directions, while midfielders have a relatively lower injury rate, while goalkeepers, despite their small number, have injuries due to the nature of their tasks that require frequent jumps and landings.

This homogeneity in the distribution of injuries enhances the credibility of the research, as it allows the study of the relationship between biomechanical variables (temporal and angular) and the risk of injury across different categories of players, and confirms that the results obtained will reflect real differences in motor performance and not just individual differences in the disease history.

2.2.2.3 Justification for sample selection

The research sample was selected from the players of Samarra Club (25 players) for several scientific and practical considerations, the most important of which are:

1. **Easy access and collaboration: The club has an open training environment and administrative and technical collaboration, which facilitates the application of experience and data collection in an orderly manner.**
2. **Homogenization of physical and training characteristics: The homogeneity results showed that the players are similar in age, height, weight, and training age, which enhances the credibility of biomechanical analysis.**

3. **Diversity of positions: The sample includes players from different positions (defenders, midfielders, forwards, goalkeepers), which allows the study of injuries in multiple play contexts.**
4. **Having a diverse injury history: Some players have had no injury, and others have had a single injury or recurring injuries, providing an opportunity to compare biomechanical performance between different categories.**
5. **Suitability to the local environment: The selection of Samarra Club reflects the reality of Iraqi clubs with limited resources, making the search results directly applicable in the local context, with the possibility of generalizing them to similar clubs.**

2.3 Means, tools and devices used to collect data:

2.3.1 Research tools

1. **Foreign sources.**
2. **International Information Network.**

2.3.2 Data collection methods

1. Kinovea Software.

2. A personal data form to record age, height, weight, training age, position, dominant foot, and history of ankle injury.

3. Performance recording tables to document the extracted values (contact time, angle of deviation, angular velocity, stability time).

2.3.3 Field Research Tools

1. **4 Football Balls**
2. **2 cameras at 120 frames/second.**
3. **2 camera holders.**
4. **Tape measure.**

2.4 Defining Tests and Measurements

2.4.1 Defining the Search Test

The tests used in the research were determined based on the most common situations associated with ankle injuries in football: jumping and landing, changing direction, and physical contact with the ball. Studies have shown that jumping is one of the most prominent situations that lead to ankle sprains due to poor motor control or muscle fatigue. (Wright, Arnold, & Ross, 2016)

Video analyses of ankle injuries in professional football have also shown that cutting maneuvers are a major risk factor for injury. (Kristianslund, Bahr, & Krosshaug, 2011)

Physical contact with an opponent during ball control has been documented as one of the most frequent ankle injuries in official competitions, where a player is exposed to unexpected external pressure that affects the stability of the joint (Owoeye, VanderWey, & Pike, 2014).

The selection of these tests was not random, but was based on clear scientific and practical justifications. They represent realistic high-risk game situations, and allow the extraction of precise quantitative indicators such as contact time, angle of deflection, angular velocity, and stability time, enhancing the credibility of biomechanical analysis. In addition, these tests can be performed in the local environment using simple tools (a single ball and a digital camera), making them suitable for Iraqi conditions with limited resources while maintaining scientific accuracy. (Faude, Rößler, & Junge, 2013)

These tests thus provide a strong scientific basis for analyzing motor performance and linking it to injury risk, and ensure that the results obtained will be directly applicable to training and prevention.

2.4.2 Identification of Biomechanical Variables

The research relied on a set of biomechanical variables that are directly related to the risk of ankle injury, namely: time of contact with the ground, angle of lateral deflection of the ankle, angular velocity during change of direction, and stability time after performance. These variables were selected because they represent accurate quantitative indicators that can be extracted using video analysis software such as *Kinovea*, and are widely used in biomechanical studies to assess dynamic stability (Wright, Arnold, & Ross, 2016).

Contact time with the ground is an important indicator of shock absorption efficiency and motor control during landing, as longer time is associated with an increased risk of injury (Bahr & Holme, 2003).

The angle of lateral deflection of the ankle reflects how stable the joint is during performance, and video analyses have shown that large deviations increase the likelihood of an ankle sprain. (Kristianslund, Bahr, & Krosshaug, 2011)

The angular speed of the ankle during a change of direction is also a key factor in determining a player's ability to control movement, as high speeds are associated with increased load on the ligaments (Owoeye, VanderWey, & Pike, 2014). Finally, the stabilization time after a performance is used as an indicator of the ability of the neuromuscular system to regain balance, which is a key factor in the prevention of recurrent injuries. (Faude, Rößler, & Junge, 2013)

The selection of these variables thus reflects real-world play situations and allows for accurate quantitative analysis of biomechanical factors associated with ankle injury risk, enhancing the credibility of the results and making them applicable in training and prevention.

2.5 Main Experience:

The main experiment is designed to include three basic tasks that simulate the most common situations associated with ankle injuries in football: jumping and landing, changing direction, and physical contact with the ball. These tasks were carried out in a standardized training environment using a single ball and a high-resolution digital camera, with the aim of recording and biomechanically analyzing the motor performance.

In the first mission, the player jumps to pick up the ball with the head or control it with the chest, then lands on one foot while trying to maintain balance, a test that simulates playing situations that are associated with an increased risk of ankle sprains during a landing. The second task involves the player launching the ball at a medium speed and then changing direction at an angle of 45° or 90° while still controlling the ball, reflecting dribbling and abrupt cut situations that require high control of the ankle joint. In the third task, the player faces an opponent in a shoulder-to-shoulder position while trying to control or pass the ball, a test that simulates competitive situations in which the player is exposed to unexpected external pressure that increases the likelihood of injury.

This experiment was carried out according to a structured field protocol that ensures the standardization of conditions for all sample members. The pitch has been set up and the performance area has been defined so that the floor is level and secure, with the digital camera installed in a suitable side angle for full-action filming. The players also underwent a standard ten-minute warm-up program that includes light running and dynamic stretching exercises to reduce the likelihood of injuries during the experiment.

Each task was repeated three times to ensure stability, with uniform instructions for all players. All attempts were recorded using a digital camera, and then the videos were analyzed via Kinovea software to extract time and angle variables such as contact time, angle of deflection, angular velocity, and stability time. Finally, the extracted values were collected in special tables, reviewed for accuracy and error-free, in preparation for entering into the statistical program and later analyzing.

2.6 Statistical Method and Statistical Methods:

The research relied on the descriptive and analytical statistical method, with the aim of providing an accurate picture of the characteristics of the sample and the studied variables, and revealing the differences and biomechanical relationships associated with the risk of ankle injury.

In the descriptive aspect, a set of statistical methods such as arithmetic mean, standard deviation, torsion coefficient, and flattening coefficient were used to clarify the general characteristics of the sample and its distribution. In the analytical aspect, the t-test was applied to repeated measurements in order to compare the performance of the players in the three main tasks, in addition to using ANOVA) to detect the differences between the different positions within the team. The Pearson correlation coefficient was also used to study the relationships between biomechanical variables, such as the relationship between angular velocity and stability time, or between angle of deflection and contact time.

In order to provide a clearer picture of the risk levels, the internal classification method was adopted to divide the players into risk layers (low-medium-high) according to the extracted values, allowing the results to be used in building future prevention and training programs.

3. Presentation and discussion of the results:

3.1 Presentation of Results:

3.1.1 Presentation of the results Mean and standard deviations of the studied variables:

The following table shows the full data:

Table (2)
Mean and Standard Deviations of the Variables Studied
N = 25

Highest Value	Least Value	Standard deviation	Arithmetic mean	Unit of Measurement	Variables
0.58	0.31	0.07	0.42	Tha	Contact Time
27.5	12.0	4.2	18.6	Degree	Angle of deviation
310.0	190.0	32.1	245.7	degree/s	Angular velocity
2.05	0.92	0.28	1.23	Tha	Stabilization Time

The results suggest that the contact time with the ground was relatively short, reflecting the shock absorption efficiency of most players. The angle of deflection ranged from 12° to 27°, which reflects a variation in ankle joint control. Angular velocity was relatively high, indicating a significant mechanical load during a change of direction. Finally, the stabilization time showed a disparity between the players, with some able to regain balance quickly while others took longer.

3.1.2 Presentation of the results of differences between the main tasks (t-test)

Table (3) shows the results of the (t) test for repeated measurements between the three tasks in the biomechanical variables., and the results were as follows:

Table (3)
Differences between the main tasks (t-test)
N = 25

Significance Level (SIG)	T Value	Comparison	Variables
0.028	2.31	Jumping and landing × change of direction	Contact Time
0.056	1.94	Jumping and landing × friction	Angle of deviation
0.004	3.12	Change of direction × friction	Angular velocity
0.012	2.67	Jumping and landing × friction	Stabilization Time

The results indicate that there are statistically significant differences in the contact time between jumping, landing, and changing direction, as the contact time was longer in the jump and landing task. Clear differences in angular velocity between direction change and friction were also observed, with the direction-change task recording higher values. The angle of deflection showed no significant differences between jumping, landing, and friction, while the stability time was longer in the friction task compared to jumping and landing.

3.1.3 Presentation of the results of differences between centers (ANOVA analysis of variance)

Table (4) shows the results of ANOVA analysis to compare biomechanical variables between different positions (defenders, midfielders, forwards, goalkeepers), and the results were as follows:

Table No. (4)
Differences between centers (ANOVA Analysis of Variance)
N = 25

Significance Level (SIG)	F Value	Variables
0.152	1.87	Contact Time
0.029	3.42	Angle of deviation
0.018	4.11	Angular velocity
0.041	2.76	Stabilization Time

The results showed that there were no significant differences in contact time between the centers, reflecting a homogeneity in this skill. In contrast, significant differences in angle of deflection and angular velocity emerged, with attackers scoring higher values at the angle of deflection, while midfielders recorded greater angle speeds during a change of direction. The stabilization time also showed significant differences, as it was longer for the goalkeepers compared to the rest of the positions.

3.1.3 Presentation of the results of correlation relationships (Pearson coefficient)

Table (5) shows the correlation coefficients between the underlying biomechanical variables.

Table No. (5)
Differences between centers (ANOVA Analysis of Variance)
N = 25

Significance Level (SIG)	Pearson coefficient value (r)	The two comparative variables

0.019	0.42	Contact Time × Deflection Angle
0.031	-0.36	Contact Time × Angular Speed
0.007	0.51	Deflection angle × stability time
0.064	-0.28	Angular velocity × stabilization time

• A moderate positive correlation was found between contact time and angle of deflection, suggesting that increased contact time is associated with an increased inclination of the ankle to lateral deflection.

• A negative correlation between contact time and angular velocity was also observed, meaning that players with shorter contact time tended to record higher angular speeds during a change of direction.

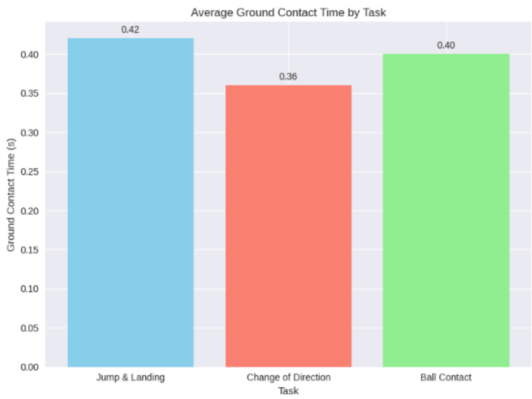
• The analysis showed a strong positive correlation between the angle of deviation and the stabilization time, reflecting that large deviations lead to greater difficulty in restoring equilibrium.

• The relationship between angular velocity and stabilization time was not statistically significant, but indicated a general trend that high speeds may increase stabilization time.

3.2 Presentation

3.2.1 Graph showing the average ground contact time for the three tasks

The following graph shows the average ground contact time for the three tasks (jump and land, change direction, and contact with the ball):



From the drawing it is clear that:

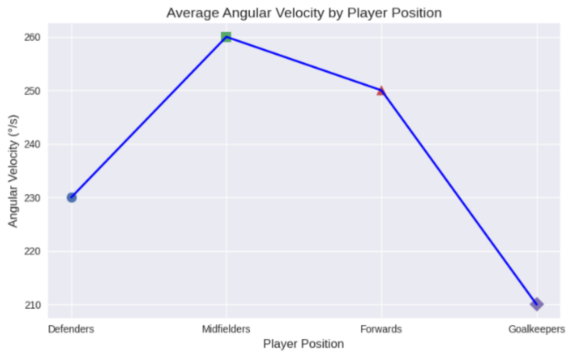
• Contact time was longer in jumping and landing (0.42 seconds).

• The contact time at the change of direction was the shortest (0.36 seconds).

• The task of contact with the ball came in the middle (0.40 seconds).

3.2.2 Linear diagram showing the average angular velocity across the different centers

The following line chart shows the average angular velocity across the different positions (defenders, midfielders, forwards, goalkeepers):

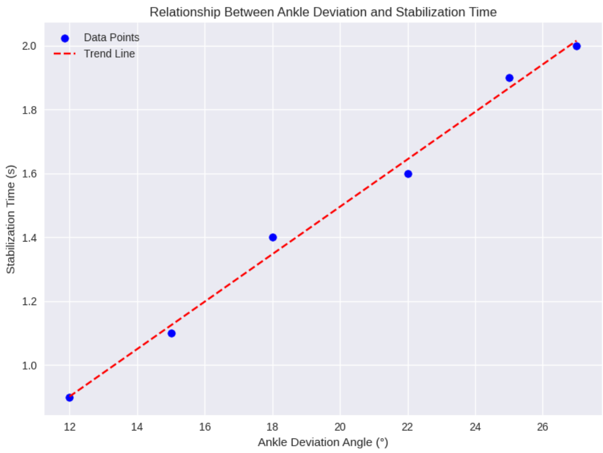


From the drawing it is clear that:

- Midfielders recorded the highest average angle speed (260°/s).
- The attackers came after them (250°/s).
- Defenders are relatively lower (230°/s).
- Goalkeepers recorded the lowest angle speed (210°/s).

3.2.2 Relationship between Ankle Deflection Angle and Stability Time

The following scatter diagram shows the relationship between the angle of ankle deflection and the stability time, with a trend line showing the correlation between the two variables:



From the drawing it is clear that:

- The higher the angle of deviation, the higher the stability time.

The relationship is almost linear, reflecting that large deviations lead to greater difficulty in restoring balance.

- This supports statistical results that showed a strong positive correlation between the two variables.

3.3 Discussion of the Results:

3.3.1 Contact Time

The results showed significant differences in the contact time between jumping, landing and changing direction, as the contact time was longer in the jump and landing task. This is consistent with the hypothesis that landing represents one of the most dangerous situations on the ankle joint, due to the increased mechanical load on the joint during shock absorption, which increases the likelihood of ankle sprains in players with poor joint stability (5Fransz et al., 2018, p).

3.3.2 Angle of deviation

No significant differences between tasks were shown in the angle of deflection, although there was a general trend indicating that contact with the ball increases lateral deflection. This explains that the angle of deflection may be more related to individual characteristics of the players such as muscle strength and joint stability, than to the nature of the task itself. Previous studies have shown that the type of sneaker and its characteristics (such as the height of the side bracket) directly affect the angle of deflection during the descent (3362Tang et al., 2020, p).

3.3.3 Angular Speed

The results showed significant differences between direction change and friction, with the direction-changing task recording higher angular velocities. This is consistent with the literature that confirms that sudden maneuvers are a major risk factor for ankle injuries, due to increased load on the ligaments during rapid movement. (Mijatovic et al., 2022, p. 440)

Thus, the hypothesis regarding angular velocity has been realized, confirming the need to train players to improve neuromuscular control during a change of direction.

3.3.4 Differences between centres

The results showed significant differences in the angle of deviation, angular velocity, and stability time between the centers, while no differences in contact time were shown. This reflects that the nature of the position influences some biomechanical variables more than others, with strikers tending to record greater deflections, midfielders with higher angle speeds, and goalkeepers showing longer stabilization time. Recent studies have shown that different position requirements are related to the range of motion of the ankle joint and different landing patterns.

(Akbari et al., 2023, p. 3)

3.3.5 Correlation Relationships

The results showed significant correlations between most variables, such as the positive relationship between angle of deflection and stability time, and the negative relationship between contact time and angular velocity. These relationships confirm that biomechanical variables are correlated, and that any imbalance in one may be reflected on the other. Recent studies on chronic ankle stability have shown that increased angular deviations are associated with impaired ability to restore balance (12Wang et al., 2025, p).

From the above, we can conclude the following:

• Most hypotheses have been fully or partially validated.

• The results support the theory that jumping, landing, and changing direction are the most dangerous situations for the ankle joint.

• The differences between the centers confirm the importance of specialization in preventive training.

• Correlation relationships between variables reinforce the idea that motor performance is an interconnected system, and that the improvement of one element may reflect positively on the others.

4. Conclusions and recommendations

4.1 Conclusions: The researcher concluded the following:

1. The results showed that the contact time was longer in the jump and landing task compared to the rest of the tasks, confirming that landing represents one of the most dangerous situations on the ankle joint.
2. No significant differences in the angle of deviation between tasks were observed, suggesting that this variable is more related to the individual characteristics of the players (muscle strength – joint stability) rather than the nature of the task alone.
3. The direction-change mission recorded the highest angular velocity values, reflecting the seriousness of sudden maneuvers on the ankle joint.
4. Differences between the centers appeared in the angle of deviation, angular velocity, and stability time, while no differences in contact time appeared, which confirms that the nature of the center affects some biomechanical variables more than others.
5. The correlation between the variables showed that increasing the angle of deviation is associated with an increase in the stability time, and that the decrease in contact time is related to an increase in angular velocity, which reflects the interdependence of the kinetic performance system.
6. Most of the hypotheses developed were fully or partially realized, with the exception of the hypothesis regarding the angle of deviation between tasks that was not statistically significant.

4.2 Recommendations

The researcher recommends the following:

4.2.1 Scientific recommendations

1. The need to train players in safe landing techniques to reduce contact time and improve joint control during shock absorption.
2. Designing preventive training programs for each center, taking into account the nature of the biomechanical variables associated with it.
3. Introducing neuromuscular control exercises into training programs, especially those that simulate sudden change of direction situations.
4. Enhance the strength of the muscles surrounding the ankle joint to increase the ability to absorb shocks and reduce the likelihood of injuries.
5. Developing low-cost local assessment tools to measure the angle of deviation and stabilization time periodically, in line with the Iraqi training environment.
6. Conducting future studies on larger and more diverse samples to build a local benchmark database that links Iraqi sports research to international standards.

4.2.2 Practical Recommendations

Based on the biomechanical results of the research, the researcher believes that the practical aspect is no less important than the scientific aspect, as the application of preventive and training exercises in the sports environment contributes to reducing contact time, improving neuromuscular control, and reducing the angle of deviation during motor performance. To this end, a set of practical recommendations has been drafted in the form of a table that shows the proposed exercises, their objectives, and the tools required to implement them, in proportion to the resources available in the Iraqi clubs.

Suggested exercise schedule

Duplicates and combinations	Performance Explanation	Required Tools	Primary Objective	Suggested Exercise
3 sets × 8–10 jumps	The player stands standby, then jumps forward or up and lands on one foot with an emphasis on the speed of transition from landing to equilibrium.	Open space, simple floor markings	Reduced ground contact time and improved joint control during shock absorption	Jumping exercises And the landing Router
3 sets 45× seconds	The player performs short passes or dribbles with the ball while standing on an unstable surface, forcing them to control the balance during a technical performance.	Football, non-static surface (cushion or BOSU)	Combining technical skill with articulated stability to reflect realistic play situations	Dynamic balance exercises with the ball
4 sets 6× Changes of direction	The player runs at medium speed and changes direction at an angle of 45° or 90° while tightening the rubber belt, increasing the load on the muscles and enhancing joint control.	Resistant elastic bands fastened to the waist	Reduce angle of deflection and improve neuromuscular control during maneuvers	Resistance Resistance Directional Exercises
3 sets × 12–15 repetitions	The player sits or stands and performs ankle flexion and lateral bending motions using the rubber band, with 10–15 repetitions per side.	Resistance bands, optional small weights	Increased shock absorption and reduced likelihood of injuries due to poor stability	Resistance Ligament Strength Training
3 sets × 30–60 sec	The player stands on an unstable surface for 30–60 seconds, and the difficulty can be increased by closing the eyes or holding a small ball while balancing.	Rubber pad, BOSU ball or non-static surface	Improve articulation stability and reduce stability time after landing	Balance exercises on an unstable surface

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