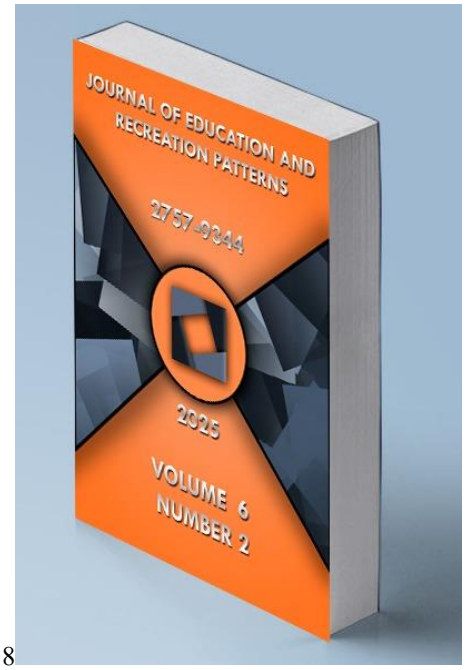

Journal of Education and Recreation Patterns (JERP)

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Foot and Ankle Biomechanical Assessment in Soccer Players: A Narrative Review of Testing Methods

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To cite this article:

Seyhan, S., & Açar, G. (2025). Foot and ankle biomechanical assessment in soccer players: A narrative review of testing methods. *Journal of Education and Recreation Patterns, 6*(2), 349-363.
DOI: https://doi.org/10.53016/jerp.v6i2.299

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Journal of Education and Recreation Patterns (JERP)
Volume 6, Issue 2, Year 2025 ISSN: 2757-9344

Foot and Ankle Biomechanical Assessment in Soccer Players: A Narrative Review of Testing Methods

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ARTICLE INFORMATION
Original Review Paper

Received 15.05. 2025
Accepted 13.12. 2025

https://jerpatterns.com

December 2025

Volume: 6, No: 2

Pages: 349-363

ABSTRACT
Foot and ankle biomechanics play a central role in soccer performance, influencing stability, movement efficiency, and injury susceptibility. Although numerous structural and functional assessment tools exist, the literature lacks an integrated synthesis that evaluates these tests collectively in relation to injury mechanisms and sport-specific demands. This narrative review aims to critically examine commonly used biomechanical assessments—including FPI-6, Navicular Drop Test, Hallux Valgus Angle, plantar pressure analysis, CAIT, FAAM, weighted dorsiflexion ROM, and tibial torsion measurements—and to highlight their relevance for identifying risk factors in soccer players. Evidence indicates that structural abnormalities such as pes planus, subtalar overpronation, and hallux valgus alter plantar pressure distribution and increase the likelihood of overuse injuries, ankle sprains, and chronic instability. Functional measures including CAIT and FAAM provide complementary insight into ankle instability and sport-related performance limitations. By synthesizing current findings, this review underscores the need for comprehensive, multi-dimensional assessment strategies that support individualized training and injury-prevention programs in soccer.

Keywords: Choronic Ankle Instability, CAIT, FAAM, FPI-6, Plantar Pressure, Soccer Biomechanics.

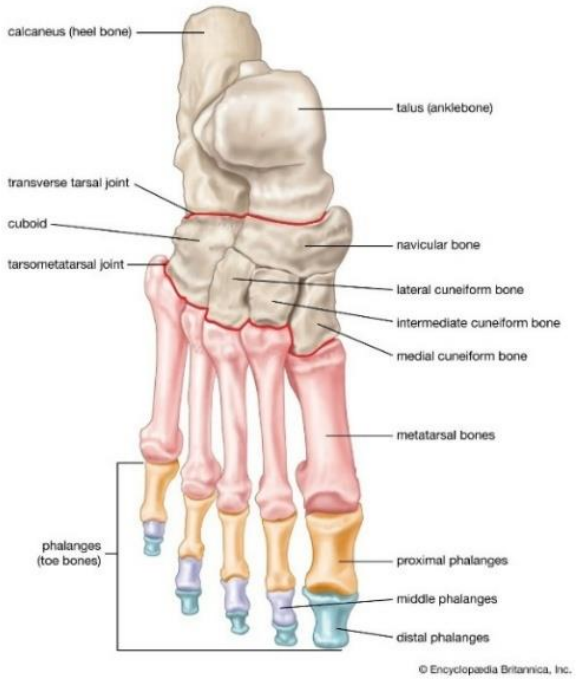
INTRODUCTION

Soccer is characterized by a high-intensity, intermittent activity profile that requires a multifaceted physiological capacity, including strength, agility, balance, and both aerobic and anaerobic systems (Svensson & Drust, 2005). Although these physical qualities vary across playing positions, a common determinant of performance is the biomechanics of the lower extremity, which underpins the execution of technical actions such as sprinting, jumping, changing direction, and kicking (Turner & Stewart, 2014). Accordingly, assessments conducted at the foot and ankle level constitute an essential component of performance monitoring and injury-risk evaluation in soccer players.

The human foot is an anatomically complex structure consisting of 26 bones, 33 joints, and numerous muscles, tendons, and ligaments. Functionally, it plays a central role in load distribution, balance, and force transmission. Anatomically, the foot is divided into the hindfoot (talus and calcaneus), midfoot (navicular, cuboid, and cuneiforms), and forefoot (metatarsals and phalanges) (Chan & Rudins, 1994; Hernández-Díaz et al., 2012) (Figure 1.). The subtalar joint, located between the talus and calcaneus, enables tri-planar movements—including pronation and supination—and is therefore critical for the transition between foot flexibility and rigidity during gait (Rodgers, 1995; Golanó et al., 2014). In sports such as soccer, ankle stability is further ensured by the medial deltoid ligament complex and the lateral ligamentous structures, including the anterior talofibular, calcaneofibular, and posterior talofibular ligaments (Dawe & Davis, 2011).

Figure 1

Foot Area and Structures



Although foot and ankle biomechanics have long been recognised as key determinants of soccer performance, previous literature has predominantly focused on general anatomical descriptions or isolated biomechanical parameters. What remains insufficiently addressed is a comprehensive synthesis of structural and functional assessment tools and how these measures collectively relate to sport-specific injury mechanisms. Moreover, despite growing evidence indicating that common deformities—such as pes planus, pes cavus, hallux valgus, subtalar overpronation, and hindfoot malalignments—contribute to altered plantar-pressure distribution and a heightened risk of stress fractures, ankle sprains, and chronic instability (Ménard et al.,

2021; Bezuglov et al., 2021), there is a lack of integrative reviews that contextualise these findings specifically within the demands of soccer. While foundational studies (e.g., Chan & Rudins, 1994; Rodgers, 1995) provide valuable historical perspectives, the increasing physical intensity of modern soccer and the accumulation of biomechanical data from 2020–2025 necessitate an updated, sport-specific framework.

This need becomes more pronounced given that contemporary soccer places greater mechanical stress on the lower extremities due to higher sprint frequencies, intensified match schedules, and increased demands for rapid deceleration and direction changes. Consequently, an evaluation approach that integrates both structural tests (e.g., FPI-6, Navicular Drop Test, Hallux Valgus Angle) and functional assessments (e.g., CAIT, FAAM, plantar-pressure analysis, Jack's Test, weighted dorsiflexion ROM, tibial-torsion measurements) has become essential. Existing research demonstrates that deviations such as pes planus or subtalar pronation can disrupt plantar loading patterns, predisposing athletes to ankle sprains, chronic instability, and overuse injuries (Valderrabano et al., 2014; Kolokotsios et al., 2021), while functional tests such as CAIT and FAAM provide complementary insight into ankle instability and sport-related functional limitations.

Therefore, the aim of this article is to critically evaluate commonly used foot and ankle biomechanical assessment tools in soccer players, synthesising structural and functional dimensions, identifying their strengths and limitations, and clarifying their relevance for performance optimisation and injury-risk management. By presenting an integrated, evidence-based framework, this review seeks to support the development of individualised training programmes and targeted preventive strategies in professional and amateur soccer contexts.

METHOD

This study was designed as a narrative review with the aim of synthesising and critically evaluating foot and ankle biomechanical assessment methods used in soccer players. A comprehensive literature search was conducted through PubMed, Web of Science, Scopus, Google Scholar, Google Akademik, and ResearchGate using keywords such as "soccer," "football," "foot biomechanics," "ankle biomechanics," "CAIT," "FAAM," "FPI-6," "plantar pressure," "navicular drop," "hallux valgus," and "tibial torsion." Inclusion criteria comprised original research articles, systematic reviews, meta-analyses, and clinical guidelines involving soccer players; studies written in Turkish or English; and those with clearly reported and accessible outcomes. Exclusion criteria included restricted-access publications, studies lacking explicit test results, and research conducted in sports other than soccer. A total of 48 studies were identified, of which 37 met the eligibility criteria and were included in the final synthesis. This methodological approach enabled a coherent and comprehensive integration of current evidence, allowing for a holistic examination of structural and functional foot–ankle biomechanical assessments in soccer populations.

Foot Biomechanical Tests

Cumberland Ankle Instability Test (CAIT)

The Cumberland Ankle Instability Tool (CAIT), which was developed to evaluate the degree of functional ankle instability and is a self-report measurement tool with proven validity and reliability, consists of 9 questions evaluated on a total of 30 points (Hiller et al., 2006). The test, which questions the functional difficulties experienced by the participant in daily life and sportive activities, evaluates whether there is a feeling of 'discharge' in the ankle in situations such as sudden change of direction, landing after jumping and standing on one foot. Each question is scored between 0 and 3 points and the score obtained in total gives information about ankle stability; scores of 27 and above are interpreted as a stable ankle, while scores of 23 and below are considered as a significant risk indicator for chronic ankle instability (CAI)

(Alanazi, 2025; Hiller et al., 2006). The importance of the CAIT test is increasing especially in football players, and this sport involves dynamic movements that strain the ankle, such as repetitive changes in direction, sudden stops and starts. Therefore, CAI is a common clinical picture in football players that negatively affects performance and decreases both training quality and competition performance by increasing the risk of proprioceptive impairment, loss of balance and re-injury (Alanazi, 2025; Kunugi et al., 2018).

Foot and Ankle Ability Measure (FAAM)

The Foot and Ankle Ability Measure (FAAM), which was developed to measure functional abilities related to the foot and ankle and has high validity and reliability, is a self-report-based tool that objectively assesses the functional levels of individuals regarding their daily life activities and sportive performances (Martin et al., 2005). The assessment consists of two parts, the Activities of Daily Living (ADL) subscale (21 items) and the Sports subscale (8 items); each item is scored between 0 (unable to perform) and 4 (no difficulty) and the results are normalised to obtain percentage values between 0-100. FAAM, which determines the level of functional limitation related to the foot and ankle of individuals, provides the opportunity to evaluate not only the presence of symptoms but also the effects of these symptoms on daily life and sportive performance in a holistic manner (Martin et al., 2005). Especially in football players, the FAAM test is widely used to demonstrate functional limitations after CAI, and it has been reported that FAAM scores decrease significantly in individuals with lateral ankle sprain, and this decrease may have long-term negative effects on dynamic balance, proprioception and motor performance (Wilczyński et al., 2024). The decrease observed in the ADL subscale indicates that the footballer has difficulty even in daily life activities, while the decrease in the Sports subscale reveals that his performance on the field is significantly affected.

Foot Posture Index-6 (FPI-6)

It is a multidimensional and observational measurement tool that provides clinical assessment of foot posture. The FPI-6, which enables the assessment of foot posture in three planes (sagittal, frontal and transverse), was developed to objectively classify the foot type (supination, neutral, pronation) of individuals (Redmond et al., 2006). This assessment is frequently used in determining functional differences and biomechanical deviations in the foot structure, especially in injury risk analyses in athletes.

The FPI-6 test is performed with bare feet and while standing. After the individual has assumed a comfortable posture, both feet are assessed according to the following six clinical observation criteria (Redmond et al., 2006):

1. Palpation of the talus head
2. Evaluation of the curves on the lateral malleolus
3. Position of the calcaneus in the frontal plane
4. Prominence in the talonavicular joint
5. Height of the medial longitudinal arch
6. Abduction/adduction position of the forefoot relative to the hindfoot

Each criterion is scored from -2 (supination symptom) to +2 (pronation symptom). The total score ranges from -12 to +12. This total score allows the foot posture to be categorised as follows:

- **Supine foot:** -1 with -12
- **Neutral foot:** 0 to +5
- **Pronated foot:** +6 to +12

The FPI-6 test provides three-plane functional information about the individual's foot type. This information allows not only structural but also functional biomechanical evaluation.

Navicular Drop Test (NDT)

The Navicular Drop Test (NDT) is a widely used, practical and clinically validated measurement method to assess the functional status of the medial longitudinal arch (MLA). This test was developed by Brody (1982) to assess the arch of the foot and is considered an important indicator of foot biomechanics (Brody, 1982; Nielsen et al., 2009).

NDT is based on measuring the height of the navicular bone in two different postures, namely sitting (non-weight bearing) and standing (weight bearing). A ruler or digital caliper is used for the measurement. With the foot flat on the ground, the vertical distance from the navicular tubercle to the ground is measured. The difference between the two positions is recorded as 'navicular drop' in millimetres (mm) (Figure 2.).

While normal limits are between 6-10 mm, values above 10 mm are generally considered as pes planus and less than 5 mm as pes cavus (Adhikari et al., 2014; Nielsen et al., 2009).

Subtalar Pronation Angle (SPA)

The subtalar pronation angle test is an important biomechanical measurement method used to assess the degree of pronation and supination movements in the subtalar joint (Figure 2.). The subtalar joint governs the movement between the ankle and calcaneus and plays a critical role in basic functions such as standing, walking and running (Tartaruga et al., 2010). The measurement is performed under static or dynamic conditions with reference to the posterior part of the calcaneus in a neutral standing position with bare feet; the inclination of the calcaneus relative to the vertical axis determines the subtalar pronation angle (Hagen et al., 2016;Tartaruga et al., 2010). The normal subtalar pronation angle is accepted to be between 4-6 degrees (Tartaruga et al., 2010; Hagen et al., 2016).

Jack's Test (Windlass Mechanism Test)

Jack's Test is a clinical manoeuvre that evaluates the plantar fascia and MLA function in the sole of the foot. During the test, the individual stands barefoot in a neutral posture and the clinician passively forces the hallux into dorsiflexion (Figure 2.). In a healthy response, elevation of the medial arch is observed with thumb dorsiflexion movement and supination occurs at the subtalar joint (Gómez-Carrión et al., 2024a; Noriega et al., 2022). This test provides a rapid assessment of the integrity and functionality of the Windlass mechanism. During normal walking, the first metatarsophalangeal joint (MTP) exhibits approximately 30-50 degrees of dorsiflexion movement, which plays a critical role in energy transmission during the foot propulsion phase (Gómez-Carrión et al., 2024b).

Jack's Test objectively assesses the stability of the medial arch, the functionality of the plantar fascia and the biomechanics of the foot. In positive test results, the medial arch rises with minimal force application; however, in negative results, collapse of the arch structure or limitation of hallux dorsiflexion may be observed. A negative test result may predispose to orthopaedic problems such as plantar fasciitis, medial tibial stress syndrome, patellofemoral pain syndrome, hallux limitus and hallux valgus (Alfaro Santafé et al., 2017; Noriega et al., 2022). In addition, inadequate Windlass mechanism activation may lead to the activation of

compensatory mechanisms in the lower extremity segments and performance losses in dynamic activities such as walking and running (Gómez-Carrión et al., 2024b).

Navicular-Medial Malleolus Distance (NMM)

The Navicular-Medial Malleolus Distance (NMM) test is a reliable measurement method used to assess the structural stability of the ankle complex and bone alignment at the thalocrural joint. During the test, the individual is positioned with the knee flexed 90 degrees and the foot in a relaxed position; then maximal dorsiflexion is achieved and the distance between the navicular tubercle and the medial malleolus is measured using callipers (Kobayashi et al., 2013) (Figure 2.). A large NMM distance (>4.65 cm) indicates decreased stability of the talocrural joint and increases the risk of non-contact lateral ankle sprains (LAS). Studies have shown that athletes with an NMM distance greater than 4.65 cm have a 4.14 times higher risk of experiencing non-contact LAS for the first time compared to those with a shorter distance (Kobayashi et al., 2013). While this test enables early objective determination of ankle stability, positive results may predispose to serious orthopaedic complications such as CAI and long-term development of osteoarthritis. The assessment of NMM distance in footballers is of critical importance, especially in terms of preventing recurrent sprains, preventing performance losses and safely managing the return to the field.

Hallux Valgus Angle (HVA)

The hallux valgus test is performed to determine the severity of medial deviation and pronation by evaluating the thumb deformity at the level of the first MTP joint. During the test, the angle between the axial lines of the thumb and the first metatarsal axis is measured with the foot in the load-bearing position; if this angle is over 15°, the presence of hallux valgus is defined (Deenik et al., 2008; Piqué-Vidal et al., 2006). The measurement can be performed using a manual goniometer or digital imaging systems and the HVA and Intermetatarsal Angle (IMA) parameters are analysed (Piqué-Vidal et al., 2006) (Figure 2.). A positive test result may indicate functional problems such as load distribution disorders in the forefoot, increased plantar pressure, bunion formation and medial plantar pain (Açar & Konakoğlu, 2023). In addition, as the deformity progresses, secondary injuries such as metatarsal instability, plantar fasciitis, knee and hip mechanical disorders may develop (Gorica et al., 2021; Kim et al., 2017).

Plantar Pressure Analysis

Plantar pressure analysis is a non-invasive method that provides detailed information about lower extremity biomechanics and foot function by measuring the distribution of forces applied to the sole of the foot under both static and dynamic conditions (Figure 2.). This analysis is performed using pedobarography systems to record the pressure distribution over the plantar surface during activities such as standing, walking or running (Lorkowski et al., 2021). During the measurement, individuals walk or perform specific functional tasks on pressure-sensitive platforms or systems equipped with in-shoe sensors. The data obtained allows for detailed analyses of pressure profiles in the anterior, medial and posterior parts of the foot and helps in the early detection of pathologies associated with foot biomechanics (Skopljak et al., 2014).

Plantar pressure analysis is used to identify imbalances in load distribution, overpressure zones and asymmetric loading. In particular, orthopaedic conditions such as plantar fasciitis, metatarsal stress fractures, hallux valgus and Achilles tendinopathy are associated with deviations in plantar pressure data (Açar & Konakoğlu, 2023). High-risk findings in the analysis include excessive pressure build-up in the lateral foot area, collapse of the medial arch, and uneven loading in the heel region. Positive test results indicate the presence of biomechanical imbalances in athletes or the general population, which may lead to an increased risk of long-term injury (Choi et al., 2014; Matsuda et al., 2017).

Weight-bearing dorsiflexion ROM

The weight-bearing dorsiflexion ROM test is a reliable measurement method that provides important information about lower extremity biomechanics and injury risk by assessing ankle dorsiflexion range of motion in a functional position. During the test, the individual tries to touch the wall by pressing the foot flat on the ground and moving the knee forwards, while ensuring that the heel does not lose contact with the ground and the knee and foot position is kept at the level of the second toe (Clark & Campbell, 2021; Hankemeier & Thrasher, 2014). The measurement is performed using the angle of the tibia bone with the ground (in degrees) or the distance from the big toe to the wall (centimetres) (Figure 2.). This test is used to assess ankle agility, loading capacity and dynamic balance performance, while dorsiflexion limitation has been associated with injuries such as plantar fasciitis, Achilles tendinopathy, ACL injuries and chronic ankle instability (Hoch et al., 2015; Lagas et al., 2021).

Tibial Torsion Test: The tibial torsion test is a clinical measurement method that aims to evaluate the rotational angle between the proximal and distal articular surfaces of the tibia. In the test application, the knee is flexed 90° while the individual is lying in the prone position and the angle of the transmalleolar axis is measured using a digital goniometer or inclinometer (Hudson, 2008). As a result of the measurement, increases or decreases in the tibial torsion angle are detected, providing information about lower extremity biomechanics (Figure 2.). The normal range of tibial torsion is usually between 20°-40°, and deviations beyond these values are associated with orthopaedic injuries such as patellofemoral instability, medial tibial stress syndrome, anterior knee pain and ankle sprains (Bayrak et al., 2018). Especially in football players, decreased tibial torsion angle increases the risk of LAS and may negatively affect their return to sport (Bayrak, 2024).

Walking and Running Analysis

Gait and running analysis is an important measurement method used to evaluate the lower extremity biomechanics of the individual and to objectively examine motor control mechanisms. In these analyses, spatiotemporal parameters (e.g. stride length, stride duration, cadence, speed), kinematic variables (e.g. joint angles, segmental movements) and kinetic measurements (e.g. ground reaction forces) are evaluated (Benson et al., 2018). While traditional laboratory-based methods include three-dimensional motion capture systems and force plates, nowadays reliable data can be obtained in real-life environments thanks to portable sensors (IMUs, pressure-based systems, accelerometers) (Higginson, 2009). During the analyses, participants walk or run on a treadmill or natural surface; data are evaluated on parameters such as spatiotemporal regularity, stride-asymmetry, contact time, and time of flight (Mason et al., 2023). Walking and running analysis is used to identify injury risk factors and optimise performance.

Balance Tests

Balance analysis is a basic measurement method used to evaluate the effectiveness of an individual's postural control mechanisms. In static balance assessments, central pressure (COP) changes are measured while the individual is standing on a fixed surface, while dynamic balance tests analyse the individual's ability to maintain balance in motion (Clark et al., 2010). Force platforms, accelerometer systems and mobile applications are used for balance assessments in clinical and laboratory settings. For example, low-cost devices such as the Wii Balance Board have the potential to perform COP measurements at laboratory standards (Clark et al., 2010). Traditional measures include protocols such as the Berg Balance Scale, Single Leg Standing Test, and Y Balance Test, and these tests allow an objective assessment of an individual's balance ability qualitatively or quantitatively (Linek et al., 2017).

Figure 2

(A): Plantar Pressure, (B): Hallux Valgus Angle Test, (C): Subtalar Pronation Test, (D): Jack's Test, (E): Tibial Torsion Test, (F): Weight Bearing Dorsiflexion ROM, (G): Navicular Drop Test, (H): Navicula-Medial Malleolus Distance Test.

Findings of Foot-Foot Biomechanical Tests in Soccer Players

The biomechanical assessment methods examined in this review provide important insights into common lower extremity pathologies observed in soccer players; however, interpretation of these findings must consider several methodological limitations within the current literature. Pes planus has been shown to increase lateral loading, thereby predisposing athletes to repetitive inversion trauma, lateral ankle sprains, and subsequent chronic ankle instability (CAI) (Ménard et al., 2021). Plantar pressure analyses further demonstrate that elevated loading in the fourth and fifth metatarsal regions increases the risk of stress fractures, and that cavovarus foot posture may represent a pathogenic configuration among soccer athletes (Ménard et al., 2021). Hallux valgus deformity—often attributed to narrow football boots, repetitive kicking mechanics, and insufficient intrinsic foot strength—can lead to inflammation, pain, and functional loss in the first metatarsophalangeal joint, negatively affecting stability and force production during sprinting, cutting, and shooting (Bezuglov et al., 2021; Deenik et al., 2008; Kim et al., 2017).

Functional assessment tools such as the CAIT are frequently used to evaluate subjective instability, with lower CAIT scores associated with impaired postural control and prolonged mediolateral balance recovery times during single-leg diagonal landing tasks (Kunugi et al., 2018). Similarly, the FAAM sports subscale has demonstrated effectiveness in assessing functional capacity in players with CAI, showing significant associations with balance performance and muscle strength metrics (Subramanian et al., 2021). Collectively, these findings indicate that CAIT and FAAM serve complementary roles in capturing subjective perceptions of instability and objective functional deficits.

Structural assessments, including the FPI-6, provide valuable information regarding foot posture and its relationship to injury risk. Pronated foot posture has been associated with overuse injuries such as medial tibial stress syndrome, plantar fasciitis, and patellofemoral pain (Tong & Kong, 2013; Algaba-Del-Castillo et al., 2023), with increasing pronation linked to poorer medial-lateral stability indices (Chun et al., 2021). NDT findings further contribute to understanding medial longitudinal arch function, as increased navicular drop has been associated with plantar fasciitis, medial tibial stress syndrome, and ACL injuries (Beckett et al., 1992; Zehnder, 2011; Domaradzki, 2024). Notably, navicular drop asymmetry may elevate

injury risk by up to 37-fold (Domaradzki, 2024). Jack's Test provides insight into plantar fascia function and the windlass mechanism, with inadequate activation contributing to instability and force production deficits during high-demand movements such as sprinting, directional changes, and jumping (Gómez-Carrión et al., 2024a; Núñez-González et al., 2025). Plantar pressure assessments further aid in early identification of overloading zones predictive of fifth metatarsal stress fractures and ankle sprains (Wong et al., 2009). Weight-bearing dorsiflexion ROM reflects functional ankle mobility, with restricted dorsiflexion linked to altered landing mechanics and elevated injury risk (Akbari et al., 2023; Hoch et al., 2015). Tibial torsion assessments and gait/running analyses contribute to identifying malalignment and abnormal loading patterns (Carling et al., 2008; Benson et al., 2022; Mason et al., 2023). Additionally, static and dynamic balance tests remain valuable predictors of injuries such as ankle sprains, ACL rupture, and muscle–tendon strains (Butler et al., 2012; Roeing et al., 2017; Linek et al., 2017).

Despite these clinically meaningful associations, the diagnostic and predictive value of these tests must be interpreted cautiously due to several methodological limitations. CAIT, for instance, is a subjective self-reported measure susceptible to mood and perception variability. Plantar pressure analyses lack standardization, as sensor resolution, sampling frequency, and calibration procedures differ substantially across laboratories, limiting generalizability. Tests such as FPI-6 and NDT are evaluator-dependent, introducing inter-rater variability that complicates cross-study comparisons. Moreover, evidence levels across the included literature—ranging from systematic reviews to cross-sectional and case-control studies—were not consistently differentiated, posing challenges for synthesizing conclusions regarding causality and predictive validity.

Taken together, the evidence suggests that no single assessment method is sufficient for identifying biomechanical risk factors in soccer players. Instead, a multidimensional screening approach is warranted, integrating subjective measures (CAIT, FAAM), structural assessments (FPI-6, NDT, HVA), functional mobility measures (weight-bearing dorsiflexion ROM), and load-distribution analyses (plantar pressure). The collective findings indicate that a minimal yet effective screening battery for elite soccer players should include CAIT, FAAM, FPI-6, NDT, and weight-bearing dorsiflexion ROM, as these tests demonstrate strong potential for early risk detection and comprehensive biomechanical profiling.

This narrative review has several limitations. The literature search was not conducted using a systematic protocol, which may introduce selection bias, and the restriction to English and Turkish publications presents a potential language bias. Most included studies were cross-sectional, limiting the ability to draw causal inferences. Additionally, some assessment tools rely on subjective reporting (e.g., CAIT) or evaluator-dependent measurements (e.g., FPI-6, NDT), which may reduce reliability, while variations in plantar pressure systems across laboratories restrict the comparability of findings.

Future research should prioritise longitudinal designs to validate the predictive value of these tests in soccer populations and to determine whether structural risk factors—such as increased pronation or excessive navicular drop—can be mitigated through targeted intervention programmes. Moreover, developing a standardised, evidence-based screening battery for practitioners would enhance the practical application of biomechanical assessments in both injury prevention and performance optimisation.

Conclusion

This review demonstrates that foot and ankle biomechanical assessments offer essential insights for performance optimisation and injury risk prediction in soccer players; however, the evidence also indicates that certain tests provide superior validity, reliability, and feasibility for

practical use. Structural assessments such as the FPI-6 and NDT are effective in identifying overuse-related biomechanical deviations, while functional tools including the CAIT and FAAM reliably capture perceived instability and sport-specific functional capacity. Weight-bearing dorsiflexion ROM further serves as a robust indicator of functional ankle mobility relevant to key soccer movements. Although plantar pressure analysis and Jack's Test contribute valuable information, their specialised equipment requirements limit routine field-based applicability. Collectively, the findings support that a minimal yet effective screening battery for elite soccer players should include CAIT, FAAM, FPI-6, NDT, and weight-bearing dorsiflexion ROM, offering a valid, reliable, and feasible framework to guide early risk identification and the design of individualised, evidence-based preventive and performance-enhancing programmes.

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Author(s)' statements on ethics and conflict of interest

Ethics statement: We hereby declare that research/publication ethics and citing principles have been considered in all the stages of the study. We take full responsibility for the content of the paper in case of dispute.

Conflicts of Interest: There are no conflicts of interest declared by the authors.

Funding: None