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Return-to-Play After Turf Toe Injuries in Elite American Football Players: A Systematic Review and Clinical Guide

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Abstract

Turf toe, a traumatic sprain of the first metatarsophalangeal joint capsuloligamentous complex, is a clinically important cause of missed playing time in elite American football players. Low-grade injuries are commonly managed conservatively, whereas complete Grade 3 disruptions present a more complex therapeutic challenge because management depends on joint stability, sesamoid alignment, performance demands, and season timing. This systematic review evaluated return-to-play rates, recovery timelines, patient-reported outcomes, and post-recovery performance after operative and nonoperative management of turf toe injuries in collegiate and professional American football players. A systematic literature search of MEDLINE via PubMed, Embase, and the Cochrane Central Register of Controlled Trials was performed from database inception through January 2026 in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidance. Eligible studies included peer-reviewed cohorts or case series reporting return-to-play outcomes after turf toe injury in elite or near-elite American football athletes. Nine primary clinical studies representing 151 competitive athletes were included in the descriptive synthesis. Nonoperatively managed athletes demonstrated higher observed return-to-play rates and shorter recovery timelines than operatively managed athletes, but these comparisons were substantially limited by confounding by indication because surgically treated athletes generally represented more severe and mechanically unstable injury patterns. Operative repair restored joint alignment and produced favorable pain outcomes in selected unstable injuries but was associated with longer rehabilitation timelines and restricted terminal dorsiflexion. Stable low-grade and selected stable high-grade injuries may be appropriate for structured nonoperative management, while unstable Grade 3 injuries require careful imaging evaluation and may benefit from operative reconstruction to preserve long-term joint stability.

Categories: Sports Medicine, Physical Medicine & Rehabilitation, Orthopedics
Keywords: american football, elite athletes, metatarsophalangeal joint, nonoperative management, operative management, return to play, sports medicine, turf toe

Introduction And Background

Turf toe injuries have been extensively investigated in the medical literature, with studies examining their historical recognition, epidemiology, biomechanical mechanisms, clinical presentation, treatment strategies, and return-to-play outcomes among American football players [1-16]. Turf toe is a traumatic sprain of the first metatarsophalangeal joint capsuloligamentous complex and represents an important source of morbidity and missed playing time in elite American football players [1,2]. The injury was first described in collegiate athletes by Bowers and Martin in 1976 at West Virginia University, where the authors documented an average of 5.4 turf toe injuries per football season [2]. Subsequent historical surveillance confirmed the clinical relevance of this injury, with Coker et al. reporting six injuries per season at the University of Arkansas and McCormick et al. identifying 4.5 injuries per season at Rice University [3,5]. Rodeo et al. later surveyed active National Football League players and found that many had sustained turf toe injuries during their careers, with a substantial proportion occurring on artificial turf [16].

Modern epidemiologic monitoring of collegiate football players through the National Collegiate Athletic Association Injury Surveillance System indicates that first metatarsophalangeal joint sprains occur at a low absolute rate but carry meaningful clinical consequences when they occur [1]. Athletes are more likely to sustain these injuries during games than during practice, and affected players may lose substantial training and competition time [1]. The transition from natural grass to artificial playing surfaces has contributed to this injury pattern because synthetic surfaces increase traction at the shoe-surface interface while flexible athletic footwear permits greater forefoot motion [1,2]. These factors place the first metatarsophalangeal joint under extreme hyperextension forces during acceleration, deceleration, and cutting maneuvers [2].

Turf toe injuries are commonly categorized using the Anderson classification system, which grades injuries from Grade 1 to Grade 3 based on clinical findings and magnetic resonance imaging pathology [5,6]. Grade 1 injuries involve stretching or attenuation of the plantar capsuloligamentous complex, Grade 2 injuries involve partial tearing, and Grade 3 injuries involve complete disruption of the plantar plate or

capsuloligamentous complex [5-7]. Grade 1 and Grade 2 injuries are usually managed conservatively, whereas Grade 3 injuries require more individualized decision-making because complete plantar plate disruption, sesamoid instability, vertical instability, or traumatic hallux valgus may compromise long-term joint function [5,8]. Comparing return-to-play outcomes between operative and nonoperative management requires careful attention to baseline injury severity and confounding by indication. Table *1* summarizes injury severity, clinical presentation, conservative management timelines, and common operative indications.

Injury grade	Anatomic pathology	Clinical presentation	Conservative management timeline	Indications for surgery
Grade 1	Stretching and attenuation of the plantar capsuloligamentous complex [2].	Focal swelling, mild tenderness, and no mechanical joint instability [5].	One to two weeks; symptomatic return to play with taping and rigid shoe inserts [5].	None [5].
Grade 2	Partial tearing of the plantar plate and capsular structures [7].	Moderate swelling, localized tenderness, restricted range of motion, and mild laxity [5].	Two to six weeks; progressive rehabilitation, taping, and rigid carbon fiber inserts [9].	Failed conservative therapy or progressive deformity [5].
Grade 3	Complete disruption of the plantar plate and capsuloligamentous complex [8].	Severe pain, extensive ecchymosis, vertical joint instability, and loss of push-off strength [5].	Six to 12 months in some severe cases; early immobilization in a CAM boot or walking cast for four to six weeks [5].	Large capsular avulsion, sesamoid diastasis or retraction, vertical instability, or traumatic hallux valgus [5].

TABLE 1: Clinical Classification and Management Considerations for Turf Toe Injuries

Data were obtained from references [2,5,7-9].

Review

Materials and methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines [10]. A review protocol was not prospectively registered in PROSPERO (International Prospective Register of Systematic Reviews) prior to study initiation.

Search Strategy

A comprehensive search was performed in MEDLINE via PubMed, Embase, and the Cochrane Central Register of Controlled Trials from database inception to January 2026. The search strategy combined controlled vocabulary and text keywords related to turf toe, American football, and return-to-play outcomes. Reference lists of retrieved articles and prior review papers were manually screened to identify additional relevant studies. The complete search strategy and record yield are presented in Table *2*.

Source	Date range	Search strategy	Records identified
MEDLINE via PubMed	Database inception to January 2026	("turf toe" OR "first metatarsophalangeal sprain" OR "plantar plate rupture" OR "first MTP joint dislocation") AND ("football" OR "National Football League" OR "NFL" OR "NCAA" OR "collegiate athlete") AND ("return to play" OR "return to sport" OR "recovery timeline")	110
Embase	Database inception to January 2026	("turf toe" OR "first metatarsophalangeal sprain" OR "plantar plate rupture" OR "first MTP joint dislocation") AND ("football" OR "National Football League" OR "NFL" OR "NCAA" OR "collegiate athlete") AND ("return to play" OR "return to sport" OR "recovery timeline")	95
Cochrane Central Register of Controlled Trials	Database inception to January 2026	("turf toe" OR "first metatarsophalangeal sprain" OR "plantar plate rupture" OR "first MTP joint dislocation") AND ("football" OR "National Football League" OR "NFL" OR "NCAA" OR "collegiate athlete") AND ("return to play" OR "return to sport" OR "recovery timeline")	40
Citation searching	Through January 2026	Reference lists of retrieved articles and previous review papers were manually screened for additional eligible studies.	0

TABLE 2: Search Strategy and Record Yield

Eligibility Criteria

Studies were evaluated using the participants, interventions, comparators, outcomes, and study design framework. The inclusion and exclusion criteria are presented in Table *3*, with each criterion listed separately to clarify the screening process.

Domain	Inclusion criteria	Exclusion criteria
Participants	Active collegiate or professional American football players with diagnosed turf toe sprains and documented return-to-play status	High school, youth, recreational, or non-elite athletes unless elite collegiate or professional data could be extracted independently
Injury severity	Any turf toe injury grade, with primary emphasis on Grade 3 capsuloligamentous disruption	Concomitant major foot or ankle injuries, including Lisfranc injuries or ankle fractures
Intervention	Operative management, including primary plantar plate repair, sesamoid stabilization, capsular reconstruction, or correction of traumatic hallux valgus	Biomechanical or cadaveric interventions without clinical return-to-play data
Comparator	Nonoperative management, including immobilization, rehabilitation, taping, rigid orthoses, or carbon fiber inserts	Studies without extractable operative or nonoperative management data
Outcomes	Return-to-play rate, time to return to play, same-season return, range of motion, pain score, patient-reported outcomes, or post-injury performance	Studies that did not report return-to-play status or clinically relevant outcomes
Study design	Peer-reviewed randomized trials, prospective or retrospective cohort studies, and case series	Reviews, conference abstracts, editorials, commentaries, and studies without extractable primary clinical data

TABLE 3: Inclusion and Exclusion Criteria

Screening and Data Extraction

Two reviewers independently screened titles and abstracts. Full-text articles were retrieved for potentially eligible studies and independently reviewed. Disagreements were resolved through discussion and consensus, with a third reviewer available for adjudication when necessary. Extracted variables included

study design, level of evidence, athlete population, injury grade, anatomic pathology, intervention type, rehabilitation protocol, return-to-play status, recovery timeline, performance outcomes, patient-reported outcomes, and complications.

Risk of Bias Assessment

Because no randomized controlled trials directly comparing operative and nonoperative treatment of turf toe injuries were identified, the included clinical studies were observational. Risk of bias was evaluated using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) tool [11]. This tool evaluates bias due to confounding, participant selection, classification of interventions, deviations from intended interventions, missing data, outcome measurement, and selection of reported results. Overall risk of bias was classified as low, moderate, serious, or critical.

Data Synthesis and Statistical Approach

Because of heterogeneity in study design, injury classification, treatment indication, rehabilitation protocols, and outcome reporting, a descriptive synthesis was performed rather than a formal meta-analysis. Reported percentages, means, standard deviations, medians, and P values were extracted from the original studies when available. No new inferential statistical testing was performed for this review. Comparative findings were interpreted cautiously because treatment selection was strongly influenced by injury severity and mechanical joint stability.

Results

Study Selection

The systematic search identified 245 records across MEDLINE via PubMed, Embase, and the Cochrane Central Register of Controlled Trials. After removal of 85 duplicates, 160 records were screened. Based on title and abstract review, 112 records were excluded. Forty-eight full-text reports were assessed for eligibility, and 38 were excluded because of nonextractable data, nonathletic populations, or concurrent severe traumatic injuries of the ankle or midfoot. Ten candidate studies underwent detailed screening, and nine primary clinical studies representing 151 competitive athletes were included in the descriptive synthesis. Figure *1* presents the PRISMA 2020 flow diagram with identification, screening, and inclusion sidebars.

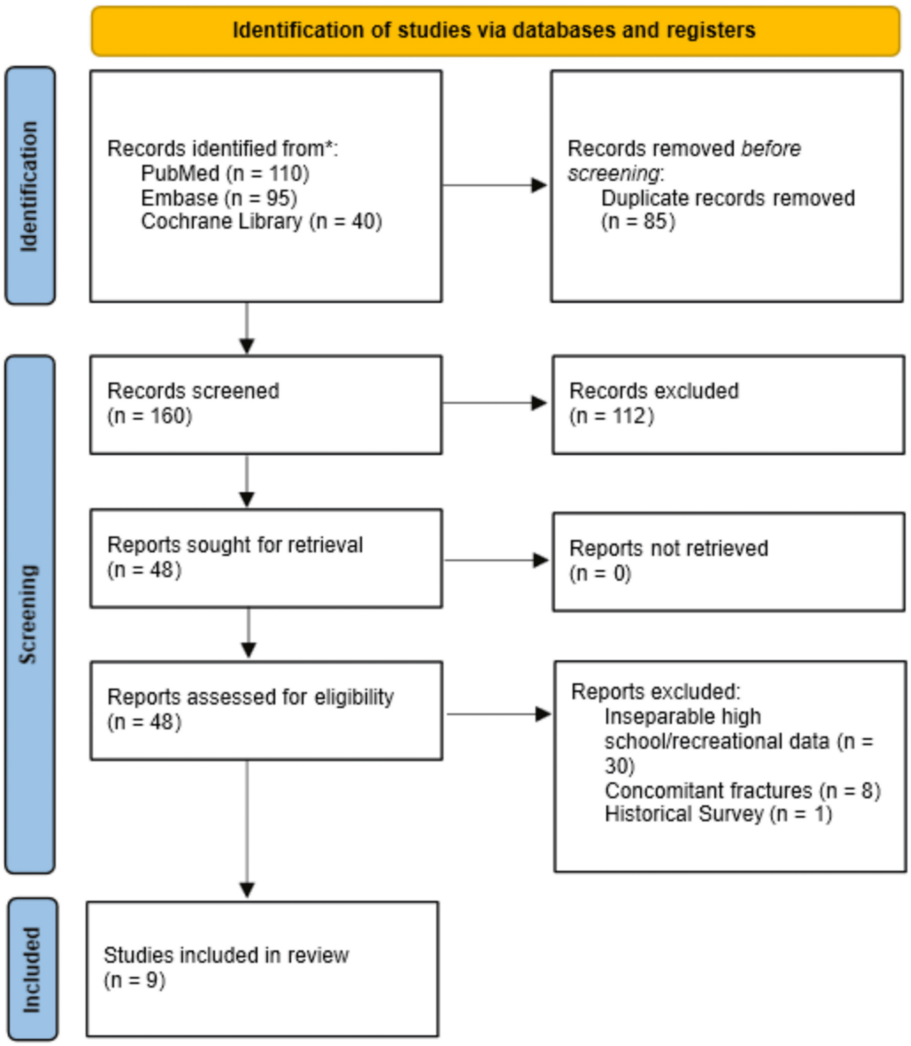


FIGURE 1: PRISMA 2020 Study Selection Flow Diagram

*Databases.

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Ten candidate studies initially met the eligibility criteria. Rodeo et al. was excluded from primary outcome extraction because it was a historical retrospective survey of career sprains rather than a monitored acute or chronic recovery cohort. Anderson was retained because the technical report included a distinct clinical cohort, and Covell et al. was retained because traumatic hallux valgus represents a clinically relevant medial-sided variant within the turf toe injury spectrum. Table *4* presents the final screening and appraisal matrix used to determine inclusion in the outcome synthesis.

Study	True turf toe cohort	Football only	Grade 3 focus	Return-to-play reported	Screening decision and rationale
Lindsey et al. [12]	Yes	Yes; National Football League	Yes; high-grade	Yes	Included as primary comparative cohort.
Smith and Waldrop [13]	Yes	Yes	Yes	Yes	Included as primary surgical cohort.
Cho et al. [1]	Yes	No; cutting sports cohort	Yes	Yes	Included with limitations because it provides contemporary Grade 3 operative outcomes relevant to elite cutting athletes.
McCormick and Anderson [5]	Yes	No; predominantly football	Mixed grades	Yes	Included to establish historical nonoperative baseline.
Covell et al. [14]	Traumatic hallux valgus variant	No; predominantly football	Yes	Yes	Included as a clinically relevant medial-sided turf toe variant.
Faltus et al. [15]	Yes	Yes; Division I athletes	Mixed grades	Yes	Included as informative small clinical series.
Coker et al. [3]	Yes	No; predominantly football	Mixed grades	Yes	Included as historical comparative cohort.
Anderson [8]	Yes	Yes	Yes	Yes	Included as retrospective technical and clinical cohort series.
Rodeo et al. [16]	Yes	Yes; National Football League	Mixed grades	No	Excluded from primary outcomes because it was a historical career survey rather than a monitored recovery cohort.

TABLE 4: Systemic Review Screening and Appraisal Matrix

Data were obtained from references [1,3,5,8,12-16].

Study Characteristics

The nine included clinical studies consisted primarily of retrospective cohorts and case series. Study populations included National Football League players, collegiate athletes, and selected elite cutting athletes with high-grade first metatarsophalangeal joint injuries. The largest directly comparative cohort was the National Football League study by Lindsey et al., which compared operative and nonoperative management of high-grade turf toe injuries [12]. Table *5* summarizes study design, athlete population, operative and nonoperative sample sizes, and reported return-to-play outcomes.

Study	Year	Design	Athletes	Operative	Nonoperative	Return-to-play data
Lindsey et al. [12]	2020	Retrospective cohort	National Football League (n = 53)	25	28	Nonoperative: 75.8 days; operative: 221.4 days.
Smith and Waldrop [13]	2018	Case series	Competitive football players (n = 15)	15	0	Operative: 16.5 weeks.
Cho et al. [1]	2025	Case series	College and elite cutting athletes (n = 28)	28	0	Operative: 20.4 weeks.
McCormick and Anderson [5]	1986	Case series	College athletes (n = 55)	1	54	Nonoperative: 0.9 weeks across grades; operative: eight weeks.
Covell et al. [14]	2017	Case series	National Football League and college athletes (n = 19)	19	0	Operative: 3.4 months.
Coker et al. [3]	1978	Case series	College athletes (n = 7)	3	4	Operative: 44.6 weeks.
Faltus et al. [15]	2014	Case series	Division I college athletes (n = 5)	5	0	Operative: 14.6 weeks.
Anderson [8]	2002	Case series	Professional and college athletes (n = 9)	9	0	Operative: 78% return rate; time not available.

TABLE 5: Characteristics of Included Turf Toe Clinical Cohorts

Data were obtained from references [1,3,5,8,12-15].

Injury Severity Stratification

Athletes sustaining turf toe injuries present with a spectrum of soft-tissue damage, making outcome comparisons unreliable unless injury severity and stability are considered. Low-grade injuries (Grade 1 and Grade 2), which involve stretching or partial tearing of the plantar capsuloligamentous complex, were represented primarily in larger historical series and generally demonstrated excellent outcomes with conservative management [3,4]. High-grade Grade 3 injuries, which involve complete tearing of the plantar plate, sesamoid instability, or traumatic hallux valgus, represented a distinct clinical entity in which treatment selection depended heavily on mechanical stability [5,8,12].

Return-to-Play Rates

For low-grade turf toe sprains, return to play was consistently favorable with conservative measures [3,4]. In the retrospective comparative National Football League cohort by Lindsey et al., athletes managed nonoperatively demonstrated an overall return-to-play rate of 100%, whereas athletes treated surgically achieved an overall return-to-play rate of 80% [12]. This observed difference should not be interpreted as evidence that nonoperative management is universally superior because operative treatment was generally reserved for athletes with more severe structural disruption and mechanical instability.

Time to Return to Play

Return-to-play timing varied according to injury grade and treatment pathway. Low-grade injuries managed conservatively often allowed rapid recovery, whereas high-grade injuries required longer rehabilitation [3,4,12]. In the Lindsey et al. cohort, nonoperative management of high-grade injuries was associated with a mean return-to-play timeline of 75.8 days, while operative repair was associated with a mean timeline of 221.4 days [12]. Same-season return was more common among nonoperative athletes in that cohort, but the comparison was limited by treatment selection bias and baseline differences in joint stability [12].

Performance Outcomes

Among professional athletes who returned to competitive play, subsequent game participation was similar between operative and nonoperative cohorts in some analyses [12]. However, performance preservation differed among skill-position athletes, with nonoperatively managed players more frequently returning to their pre-injury level of performance than operatively managed players [12]. This finding is clinically important but should be interpreted in the context of confounding by indication because skill-position athletes selected for surgery likely had more severe disruption of the plantar plate and sesamoid complex.

Patient-Reported Outcomes and Complications

Operative treatment produced favorable pain and functional outcomes in selected severe injuries. Smith and Waldrop reported a mean postoperative American Orthopaedic Foot & Ankle Society Hallux score of 91.3 at an average follow-up of 27.5 months, with low pain scores at rest and with activity [13]. Cho and Drakos also reported postoperative improvements in Patient-Reported Outcomes Measurement Information System domains after Grade 3 surgical repair [1]. Nevertheless, operative repair may restrict terminal dorsiflexion, and reported complications have included wound issues, complex regional pain syndrome, sesamoiditis, and persistent stiffness [13].

Heterogeneity and Risk of Bias

Included studies varied substantially in injury grading, operative technique, rehabilitation protocol, return-to-play definition, follow-up duration, and outcome reporting. The ROBINS-I assessment identified a serious risk of bias in the confounding domain across included observational studies, primarily because athletes selected for surgery generally had more severe structural pathology than athletes treated nonoperatively [11]. Table *6* summarizes the risk-of-bias assessment.

Study	Confounding	Participant selection	Intervention classification	Deviations from intervention	Missing data	Outcome measurement	Overall bias
Lindsey et al. [12]	Serious	Moderate	Low	Low	Low	Moderate	Serious
Smith and Waldrop [13]	Serious	Low	Low	Low	Low	Moderate	Serious
Cho et al. [1]	Serious	Low	Low	Low	Moderate	Moderate	Serious
McCormick and Anderson [5]	Serious	Moderate	Low	Low	Low	Serious	Serious
Covell et al. [14]	Serious	Low	Low	Low	Low	Moderate	Serious
Coker et al. [3]	Serious	Moderate	Low	Low	Moderate	Serious	Serious
Faltus et al. [15]	Serious	Low	Low	Low	Low	Moderate	Serious
Anderson [8]	Serious	Low	Low	Low	Moderate	Moderate	Serious

TABLE 6: Risk of Bias Assessment Using ROBINS-I

Data were obtained from references [1,3,5,8,12-15].

ROBINS-I: Risk of Bias in Non-randomized Studies of Interventions.

Discussion

This systematic review found that nonoperative cohorts demonstrated higher observed return-to-play rates, shorter recovery timelines, and greater preservation of pre-injury performance than operative cohorts. However, these findings should be interpreted cautiously because the comparison is substantially influenced by confounding by indication. Athletes selected for operative repair generally represented the most severe spectrum of Grade 3 injury, including complete plantar plate rupture, proximal sesamoid retraction, transverse instability, vertical instability, or traumatic hallux valgus [5,8,12,14].

The apparent advantage of nonoperative management likely reflects baseline injury stability rather than treatment effect alone. Stable high-grade injuries may heal with immobilization, progressive rehabilitation, taping, and rigid orthotic support when sesamoid alignment and joint congruity are preserved. In contrast, unstable high-grade injuries have compromised plantar restraint mechanisms and are less likely to regain durable mechanical function without surgical reconstruction. Therefore, operative and nonoperative management should be viewed as complementary strategies applied to different injury patterns rather than directly competing interventions.

Surgical reconstruction can restore alignment, reduce pain, and limit progressive deformity in appropriately selected athletes, but it also introduces postoperative stiffness and longer rehabilitation timelines. Terminal dorsiflexion of the first metatarsophalangeal joint is essential for explosive push-off, sprinting, and cutting. Even modest postoperative restriction may be clinically meaningful for running backs, wide receivers,

defensive backs, and quarterbacks. This biomechanical tradeoff helps explain why some surgically treated athletes return to competition but do not fully regain pre-injury performance levels [12,13].

The rehabilitation protocols summarized in this review represent a synthesis of published strategies rather than validated clinical guidelines. Return-to-play progression should be individualized and based on pain, swelling, mechanical stability, radiographic or magnetic resonance imaging findings, toe-off strength, sport-specific movement tolerance, and shared decision-making among the athlete, surgeon, athletic trainer, and team medical staff.

Proposed Rehabilitation Framework

Nonoperative acute phase: During the first one to two weeks, treatment focuses on pain control, swelling reduction, and protection of the plantar plate. Immobilization in a controlled ankle motion (CAM) boot, DARCO boot (DARCO International, Inc., Huntington, West Virginia), or walking cast may be used for high-grade injuries, while dorsiflexion is restricted and active plantarflexion may be encouraged as tolerated [5,9].

Nonoperative subacute phase: During weeks two to six, protected range of motion and intrinsic foot strengthening can be introduced gradually. Progressive weightbearing may be paired with rigid carbon fiber inserts or a Morton extension to limit first metatarsophalangeal dorsiflexion during gait [9].

Nonoperative functional phase: During weeks six to 10, rehabilitation emphasizes proprioception, dynamic balance, straight-line running progression, and eventual sport-specific movement. Cutting and pivoting should be delayed until the athlete can run at full speed without pain, swelling, or gait deviation [9].

Postoperative immobilization phase: During the first four weeks after surgical repair, the athlete is typically maintained non-weightbearing or protected in a short-leg cast or CAM boot. The main goals are wound healing, edema control, protection of the repair, and preservation of proximal conditioning [5,9].

Postoperative protected motion phase: During weeks four to eight, partial weightbearing may progress toward full weightbearing in a boot. Passive range of motion is introduced cautiously, with dorsiflexion limited to protect the repaired plantar plate [9].

Postoperative strengthening and sport-specific phase: During weeks eight to 20, athletes may transition toward stiff-soled shoes with carbon fiber inserts, progressive strengthening of the flexor hallucis complex, proprioceptive work, linear running, and gradual multidirectional cutting. Full-contact return is typically considered only after pain-free terminal dorsiflexion, symmetric toe-off strength, and sport-specific tolerance are restored [9].

Clinical Implications

Advanced imaging and mechanical instability testing are central to treatment selection. Elite athletes with suspected Grade 3 turf toe should be evaluated for sesamoid diastasis, plantar plate rupture, vertical instability, traumatic hallux valgus, and loss of push-off strength [5,8]. When joint congruity is preserved, structured nonoperative management may permit timely return. When joint instability is present, surgical repair may be necessary to restore durable alignment and reduce the risk of progressive deformity.

Clinicians should counsel elite skill-position athletes that operative repair of unstable Grade 3 turf toe injuries may require prolonged rehabilitation and may limit same-season return. Counseling should also emphasize that rapid return after nonoperative treatment is appropriate only when the joint is stable and protected. Returning prematurely with unrecognized instability may increase the risk of chronic pain, progressive hallux valgus, clawing, flexor hallucis longus tenosynovitis, and accelerated hallux rigidus [5,8].

Rigid carbon fiber orthoses with a Morton extension are commonly used during return-to-play progression after both operative and nonoperative treatment. These devices limit painful terminal dorsiflexion and may reduce recurrent stress across the plantar plate during early return to sport [5,9].

Limitations

This review is limited by the quality of the available evidence. Included studies were primarily retrospective cohorts and case series, and no randomized trials comparing operative and nonoperative management were identified. The evidence base was also limited by small sample sizes, heterogeneous injury definitions, inconsistent grading systems, variable follow-up durations, and inconsistent reporting of return-to-play and performance outcomes. In addition, some retained studies included non-football cutting athletes or athletes outside the primary National Football League and National Collegiate Athletic Association Division I population. These studies were retained only when they provided clinically relevant high-grade operative outcome data, but their inclusion limits sport-specific generalizability.

Future Research Directions

Future multicenter studies should use standardized injury classification systems, uniform return-to-play definitions, validated patient-reported outcome measures, and prospective data collection. Given the low absolute frequency of surgically treated turf toe injuries, collaboration across collegiate and professional organizations will likely be necessary to generate adequately powered cohorts. Future research should evaluate career longevity, position-specific performance metrics, long-term degenerative change, and the comparative effectiveness of standardized rehabilitation protocols.

Conclusions

Turf toe injuries remain an important source of morbidity and lost playing time among elite American football athletes. Low-grade injuries are consistently associated with favorable outcomes after conservative treatment, whereas Grade 3 injuries require careful assessment of structural stability, sesamoid alignment, and athlete-specific performance demands.

Stable high-grade injuries may return successfully with structured nonoperative management and rigid protection, while unstable Grade 3 injuries may require operative reconstruction to restore joint congruity and prevent progressive deformity. Operative treatment is generally associated with longer rehabilitation timelines, but it remains an important option for athletes with mechanical instability. Future prospective studies are needed to refine treatment algorithms and improve return-to-play decision-making for elite athletes with turf toe injuries.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Joshua J. Leazer, Vijay Karthikeya Raja, Jared W. Nichols

Acquisition, analysis, or interpretation of data: Joshua J. Leazer, Vijay Karthikeya Raja

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Critical review of the manuscript for important intellectual content: Joshua J. Leazer, Vijay Karthikeya Raja

Supervision: Jared W. Nichols

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