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REVIEW ARTICLE

# Diagnostic Performance of Ultrasonography for Detection of Acute Injuries of Lateral Ankle Ligaments: A Systematic Review and Meta-analysis

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**Abstract:** **Introduction:** Several studies have assessed the diagnostic accuracy of ultrasonography for detecting acute lateral ankle ligament injuries, but their findings have been inconsistent. This systematic review and meta-analysis investigated the pooled diagnostic performance of ultrasonography for early detection of acute injuries of the four lateral ankle ligaments. **Methods:** Major databases with a high likelihood of containing eligible studies, including Medline, Scopus, and Web of Science, were systematically searched from inception to April 2026. Diagnostic parameters were estimated using the extracted contingency table data, with MetaDisc software and the MIDAS package in Stata. **Results:** 10 eligible studies, with a total of 454 patients, were included in the analyses. The sensitivity of ultrasonography for diagnosing injuries of the anterior talofibular ligament (ATFL), calcaneofibular ligament (CFL), posterior talofibular ligament (PTFL), and anterior inferior tibiofibular ligament (AITFL) were 0.95 (95% CI, 0.92–0.98), 0.82 (95% CI, 0.76–0.88), 0.33 (95% CI, 0.13–0.59), and 0.90 (95% CI, 0.74–0.98), respectively. The specificity for detecting injuries of the ATFL, CFL, PTFL, and AITFL was 0.91 (95% CI, 0.85–0.96), 0.90 (95% CI, 0.85–0.95), 0.96 (95% CI, 0.90–0.99), and 0.86 (95% CI, 0.78–0.92), respectively. **Conclusion:** Ultrasonography demonstrates high diagnostic accuracy for detecting lateral ankle ligament injuries, particularly for the ATFL and AITFL, with strong sensitivity and specificity. It is also effective for both confirming and excluding ATFL injuries. For CFL injuries, ultrasonography shows good diagnostic performance, although it is more effective for confirming than excluding CFL pathology. In contrast, its low sensitivity for PTFL injuries limits its diagnostic reliability for this ligament.

**Keywords:** Ultrasonography; Lateral Ligament, Ankle; Diagnosis; Meta-analysis

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## 1. Introduction

Among the most prevalent ankle joint injuries are acute sprains, which are commonly reported in both professional and everyday activities (1, 2). More than 50% of adults are estimated to have experienced varying degrees of lateral ankle sprains (2). Injuries to the lateral collateral ligament complex primarily involve the anterior talofibular ligament (ATFL) and the calcaneofibular ligament (CFL), which are the most commonly damaged structures during ankle inversion. Two other ligaments, the posterior talofibular ligament (PTFL) and the anterior inferior tibiofibular ligament (AITFL), may also be involved (3). Lateral ligament injuries are typically classified into three grades: grade I, a mild strain with ligament stretching or relaxation; grade II, a partial ligament tear with partial loss of function; and grade III, a complete ligament tear associated with instability. Acute lateral ligament tears require appropriate management based on the severity of injury, as missed ligament tears may progress to complete rupture and chronic instability, particularly if the ankle is used prematurely before adequate healing. These severe consequences highlight the importance of early detection of lateral ligament injuries during the acute phase, especially in emergency settings (4-6).

Physical examination findings in acute lateral ligament injuries are often limited. Lateral stress radiography may provide some diagnostic information; however, its utility remains debatable, particularly because patient cooperation is often reduced during the acute painful phase of injury (7). Magnetic resonance imaging (MRI) is another diagnostic modality that provides more reliable findings, although it is less accessible, more time-consuming, and more costly (8, 9). Ultrasonography, on the other hand, offers greater accessibility, lower cost, and rapid, user-friendly application in emergency settings. It may therefore serve as a valuable

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imaging modality for the early detection of lateral ligament injuries, facilitating timely immobilization and appropriate treatment according to injury grade (10). Although several studies have investigated the diagnostic accuracy of ultrasonography for identifying these injuries in the acute phase, their findings have been inconsistent, necessitating a comprehensive pooled analysis of the available evidence (8, 10-19). In this study, we estimated the pooled diagnostic performance of ultrasonography for the early detection of acute injuries of the four lateral ankle ligaments.

# 2. Methods

## 2.1. Search strategy

The protocol of this meta-analysis was registered in PROSPERO (CRD420261385273). We systematically searched major databases with a high likelihood of retrieving all eligible studies, including Medline, Scopus, and Web of Science, from inception to April 2026. In addition, the references and citation records of eligible studies were investigated to minimize the risk of missing relevant articles.

A gray literature search was also conducted by incorporating the advanced search features of Google Scholar. We combined Medical Subject Headings (MeSH) and their keywords covering ultrasonography, lateral ankle ligaments, and diagnostic accuracy. Boolean operators were applied, using "OR" for synonyms and "AND" to combine the three main components of the search strategy. Supplementary file 1 provides the complete search strategies for all three databases.

## 2.2. Eligibility criteria

Studies were included that investigated the accuracy of ultrasonography for the early diagnosis of acute injuries to the four main lateral ankle ligaments: ATFL, CFL, PTFL, and AITFL. Eligible studies must report sufficient data to construct a 2×2 contingency table or include data allowing its calculation.

The study population consisted of cases older than 12 years in the acute phase of injury. The index test was ultrasonography, and the gold standard was magnetic resonance imaging (MRI) or operative findings.

We excluded case reports and case series with fewer than ten participants, studies focusing on chronic ankle injuries, reviews, preprints, animal studies, and studies with insufficient data to construct a 2×2 table.

## 2.3. Data extraction

First author, publication year, total number of participants, age, country, ultrasound frequency, 2×2 table data, imaging operator, and type of assessed ligaments were extracted. Three investigators, including two primary data extractors and one resolver, conducted the data extraction using Excel sheet.

## 2.4. Quality assessment

Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2) tool, covering seven domains was used for quality appraisal. Two independent reviewers performed the assessment.

## 2.5. Statistical analysis

Diagnostic parameters were estimated based on the extracted 2×2 table data using MetaDisc software and the MIDAS package in Stata software (Version 17). Heterogeneity was evaluated using the Cochrane test, the $I^2$ statistic, and boxplots.

Fagan nomograms and scattergram plots were used to assess the clinical applicability of the index test for ruling in and ruling out ligament injuries. Influence analysis was conducted to identify potential outlier studies. Deeks' funnel plot and test was used for publication bias assessment. Meta-regression analysis was conducted with respect to potential sources of heterogeneity.

# 3. Results

## 3.1. Characteristics of the studies

An advanced search in three databases yielded a total of 535 studies. After removing 223 duplicate publications using EndNote software, 312 titles and abstracts were reviewed. Of these, 25 full-texts underwent full evaluation, and ultimately, 10 eligible studies, with a total of 454 patients, were included in the analyses (Figure 1). The timeframe for the studies' publication extends from 1993 to 2025, and the majority of the imaging procedures were performed by radiologists. The ATFL and CFL were the most commonly evaluated ligaments. Table 1 summarizes further study particulars.

## 3.2. Quality assessment and publication bias

A higher risk of publication bias was identified in the areas of patient selection, flow, and timing according to the QUADAS-2 tool. Several publications had an unclear risk of bias regarding patient selection, the index test, and the reference standard. However, the majority of the studies showed a low risk of bias in terms of applicability items (Table 2). Deeks' funnel plot and statistical tests, based on the results for the ATFL, CFL, and AITFL ligaments, revealed no significant publication bias ($p > 0.05$) (Figure 2).

## 3.3. Meta-analysis

The sensitivity of ultrasonography for diagnosing injuries of the ATFL, CFL, PTFL, and AITFL were 0.95 (95% CI, 0.92–0.98), 0.82 (95% CI, 0.76–0.88), 0.33 (95% CI, 0.13–0.59), and 0.90 (95% CI, 0.74–0.98), respectively (Figure 3). The specificity for detecting injuries of the ATFL, CFL, PTFL, and AITFL was 0.91 (95% CI, 0.85–0.96), 0.90 (95% CI, 0.85–0.95), 0.96 (95% CI, 0.90–0.99), and 0.86 (95% CI, 0.78–0.92), respectively (Figure 4). The Positive Likelihood Ratios (PLR) for identifying injuries of these ligaments were 5.83 (95%

CI, 3.08–11.03), 6.24 (95% CI, 2.18–17.89), 8.56 (95% CI, 2.87–25.57), and 6.65 (95% CI, 0.54–81.50), respectively (Figure 5). The pooled Negative Likelihood Ratios (NLR) were 0.09 (95% CI, 0.05–0.17), 0.21 (95% CI, 0.09–0.53), 0.70 (95% CI, 0.51–0.97), and 0.17 (95% CI, 0.07–0.41) for these ligaments, respectively (Figure 6). The Diagnostic Odds Ratios (DOR) for diagnosing injuries of the four ligaments were 90.27 (95% CI, 34.64–235.29), 27.17 (95% CI, 10.21–72.35), 13.12 (95% CI, 3.24–53), and 52.07 (95% CI, 4.46–607.36), respectively (Figure 7).

The AUC for the ATFL, CFL, and AITFL were 0.95, 0.91, and 0.94, respectively (Figure 8). The estimated pooled accuracy for diagnosing injuries of the ATFL, CFL, PTFL, and AITFL were 0.95 (95% CI, 0.89–0.99), 0.92 (95% CI, 0.83–0.98), 0.88 (95% CI, 0.81–0.93), and 0.82 (95% CI, 0.47–1), respectively (Figure 9).

Goodness-of-fit and bivariate normality plots indicated that the studies followed the diagonal line, and influential analysis identified two studies. However, the outlier detection analysis did not reveal any outliers (Figure 10). Fagan plots demonstrated that a positive ultrasonography result for an ATFL injury increased the probability of the injury from 66% to 96%, while a negative result reduced the probability to 7%. Similarly, a positive ultrasonography result for a CFL injury increased the probability from 45% to 93%, while a negative result reduced it to 8% (Figure 11). The scattergram revealed that ultrasonography can be effectively used both for confirming and excluding ATFL injuries, but it is particularly more effective for confirming CFL injuries (Figure 12).

### 3.4. Heterogeneity and Meta-regression analysis

We observed significant heterogeneity between studies regarding the sensitivity for ATFL and CFL injuries ($p < 0.05$). Additionally, significant heterogeneity was found in the specificity results for CFL injuries ($p < 0.05$).

Meta-regression analysis based on the results for ATFL injuries indicated that higher prevalence rates and the use of ultrasonography with an ultrasound frequency of ≥9 MHz significantly improved sensitivity ($p < 0.05$ and $p < 0.01$, respectively). For CFL injuries, meta-regression revealed that an increase in prevalence significantly reduced the specificity of ultrasonography ($p < 0.001$). Furthermore, conducting ultrasonography by radiologists and using ultrasound frequencies ≥9 MHz were both associated with significantly higher specificity ($p < 0.01$ and $p < 0.001$, respectively) (Figure 13).

## 4. Discussion

This meta-analysis revealed that ultrasonography has a high sensitivity of 0.95 and 0.90 for detecting injuries to the ATFL and AITFL, respectively. It demonstrated a sensitivity of 0.82 for the CFL and a low sensitivity of 0.33 for the PTFL. However, ultrasonography exhibited high specificity of 0.91, 0.90, and 0.96 for the ATFL, CFL, and PTFL, respectively, and a lower specificity of 0.86 for the AITFL. The accuracy for diagnosing injuries to the ATFL and CFL (0.95 and 0.92) was higher than for the PTFL and AITFL (0.88 and 0.82). Additionally, we found that ultrasonography is highly effective both for confirming and excluding ATFL injuries, with a particularly higher effectiveness in confirming CFL injuries. Using an ultrasound frequency of ≥9 MHz significantly enhances the sensitivity of ultrasonography for detecting ATFL injuries and the specificity for detecting CFL injuries.

A similar meta-analysis was conducted by Seok et al. (20) on publications retrieved from only two databases, PubMed and EMBASE. They evaluated the diagnostic accuracy of ultrasonography for detecting injuries to the ATFL and CFL. Their final analysis included 10 studies with a total of 380 patients. Seok et al. indicated a sensitivity of 0.99 and specificity of 0.92 for ATFL injuries, which were higher than the values found in our study. For the detection of CFL injuries, they found a sensitivity of 0.95 and specificity of 0.99, which were also greater than the corresponding results in our meta-analysis. These differences may, in part, be explained by variations in inclusion criteria. Our meta-analysis included only studies on acute cases, while Seok et al. included both acute and chronic cases, with approximately half of the studies in their analysis focusing on chronic patients.

Another meta-analysis was conducted by Cao et al. (21), which examined studies investigating the diagnostic accuracy of MRI, ultrasonography, and/or radiography for detecting ligament injuries of the ATFL. They reported a sensitivity of 0.96 and specificity of 0.92 for the ultrasonographic detection of ATFL injuries, which were slightly higher than the values found in our meta-analysis. Similar to the previous pooled analyses by Seok et al., Cao et al. included studies on both acute and chronic cases, with the majority of studies focusing on chronic cases. However, their findings were more similar to ours than to Seok et al.'s.

We found that an ultrasound frequency of ≥9 MHz is significantly associated with increased sensitivity of ultrasonography for detecting ATFL injuries and increased specificity for detecting CFL injuries. Accumulating evidence suggests that lower ultrasound frequencies are associated with greater depth of penetration but lower resolution, whereas higher frequencies provide less depth of penetration but greater resolution (22, 23). Therefore, the improved diagnostic performance observed in our meta-analysis with higher ultrasound frequencies may be attributed to the enhanced resolution achieved at these frequencies.

Radiologists and other sonographers did not differ significantly regarding sensitivity and specificity for detecting ATFL injuries, or in sensitivity for diagnosing CFL injuries. However, the specificity of ultrasonography performed by radiologists for detecting CFL injuries was higher than that of other sonographers. Overall, ultrasonography performed by trained imaging operators in emergency departments can be considered a reliable diagnostic approach; however, radiologist-interpreted examinations may be preferable, particularly for CFL injuries. The small number of included studies precluded the use of meta-regression for PTFL and AITFL injuries. Therefore, the generalizability of findings derived from ATFL and CFL analyses to PTFL and AITFL injuries is limited.

# 5. Limitations

Our study had several limitations. First, we did not include studies conducted on pediatric patients. Second, we excluded studies involving chronic cases of lateral ankle ligament injuries. Third, we did not evaluate the performance of ultrasonography in comparison with radiography or MRI. Fourth, we did not perform a cost analysis to provide a more comprehensive comparison. Fifth, we included only studies published in English. Finally, the number of publications for certain ligaments was limited, which prevented some statistical evaluations from being conducted. The strength of our study lies in its comprehensive diagnostic analysis of four different lateral ankle ligaments, providing valuable insights into the clinical applicability of ultrasonography for ruling in and ruling out injuries. Furthermore, our study benefited from an advanced search strategy, ensuring the inclusion of all relevant studies. We also identified key factors that enhance the diagnostic performance of ultrasonography for detecting ankle ligament injuries, such as ultrasound frequency and the type of operator. These findings can help improve the clinical utility of ultrasonography in real-world settings.

# 6. Conclusions

Ultrasonography demonstrates high diagnostic accuracy for detecting lateral ankle ligament injuries, particularly for the ATFL and AITFL, with strong sensitivity and specificity. It is also effective for both confirming and excluding ATFL injuries. For CFL injuries, ultrasonography shows good diagnostic performance, although it is more effective for confirming than excluding CFL pathology. In contrast, its low sensitivity for PTFL injuries limits its diagnostic reliability for this ligament. Overall, ultrasonography represents a valuable, non-invasive, and accessible first-line imaging modality for acute lateral ankle ligament injuries, especially in emergency and clinical settings. Diagnostic performance is enhanced with the use of high-frequency probes ($\geq$9 MHz) and when examinations are performed or interpreted by radiologists. However, its limitations in certain ligaments, particularly the PTFL, should be considered in clinical decision-making.

# 7. Declarations

## 7.1. Acknowledgments

None.

## 7.2. Authors' contributions

All authors contributed to study design, data collection, and writing the draft of the study. All authors read and approved final version of manuscript.

## 7.3. Funding/Support

None.

## 7.4. Conflict of interest

None.

## 7.5. Data Availability

Not applicable.

## 7.6. Using Artificial Intelligence Chatbots

We used ChatGPT version 5.1 to check grammar and enhance the academic quality and clarity of the text, which was primarily written by the authors. The final version of the text, after incorporating ChatGPT-assisted improvements, was thoroughly reviewed and approved by the authors.

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**Table 1:** Characteristics of the included studies

| Authors | Year | Country | Number | Age (year) | US Frequency | US Operator | ATFL | CFL | PTFL | AITFL | DL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Friedrich et al. (15) | 1993 | Germany | 37 | Mean=21 (18-25) | 7.5 MHz | Sonographer | Yes | Yes | NA | NA | NA |
| Milz et al. (18) | 1998 | Germany | 20 | NA | 13-MHz | NA | Yes | Yes | NA | Yes | NA |
| Oae et al. (19) | 2010 | Japan | 19 | Mean=29 (13–55) | 9 MHz | Orthopedic Surgeon | Yes | NA | NA | NA | NA |
| Margetic et al. (17) | 2012 | Croatia | 30 | 16–66 | 7–15 MHz | Radiologist | Yes | Yes | NA | NA | NA |
| Gün et al. (10) | 2013 | Turkey | 65 | 34.03 ± 12.85 | 7.5 MHz | Emergency Physician | Yes | NA | NA | NA | NA |
| Baltes et al. (12) | 2021 | Quatar | 92 | NA | 5–12 MHz | Radiologist | Yes | Yes | NA | Yes | NA |
| Esmailian et al. (14) | 2021 | Iran | 31 | 30.73 ± 10.15 | 7.5 MHz | Radiologist | Yes | Yes | Yes | NA | NA |
| Hosseinian et al. (16) | 2021 | Iran | 105 | 32.9 ± 8.99 | 10–12 MHz | Radiologist | Yes | Yes | Yes | NA | Yes |
| Ergün et al. (13) | 2023 | Turkey | 30 | 30 ± 6.4 | 5–12 MHz | Radiologist | Yes | Yes | NA | Yes | NA |
| Abdulqader et al. (11) | 2025 | Iraq | 25 | 32.3±12.5 | 8-18 MHz | Radiologist | Yes | NA | NA | NA | NA |

US: Ultrasonography; ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament; DL: Delta Ligament; MHz: Megahertz; NA: Not applicable.

**Table 2:** Quality Assessment Using QUADAS-2

| Study | Risk of bias | | | | Applicability concerns | | |
|---|---|---|---|---|---|---|---|
| | Patient selection | Index test | Reference standard | Flow and timing | Patient selection | Index test | Reference standard |
| Friedrich et al. (15) | ☺ | ? | ? | ☹ | ☺ | ☺ | ☺ |
| Milz et al. (18) | ? | ? | ? | ☺ | ☺ | ☺ | ☺ |
| Oae et al. (19) | ☹ | ☺ | ☺ | ☺ | ☹ | ☺ | ☺ |
| Margetic et al. (17) | ? | ? | ? | ☹ | ☺ | ☺ | ☺ |
| Gün et al. (10) | ☹ | ☺ | ? | ☺ | ☺ | ☺ | ☺ |
| Baltes et al. (12) | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Esmailian et al. (14) | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Hosseinian et al. (16) | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Ergün et al. (13) | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |
| Abdulqader et al. (11) | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ | ☺ |

☺: Low Risk; ☹: High Risk; ?: Unclear Risk.

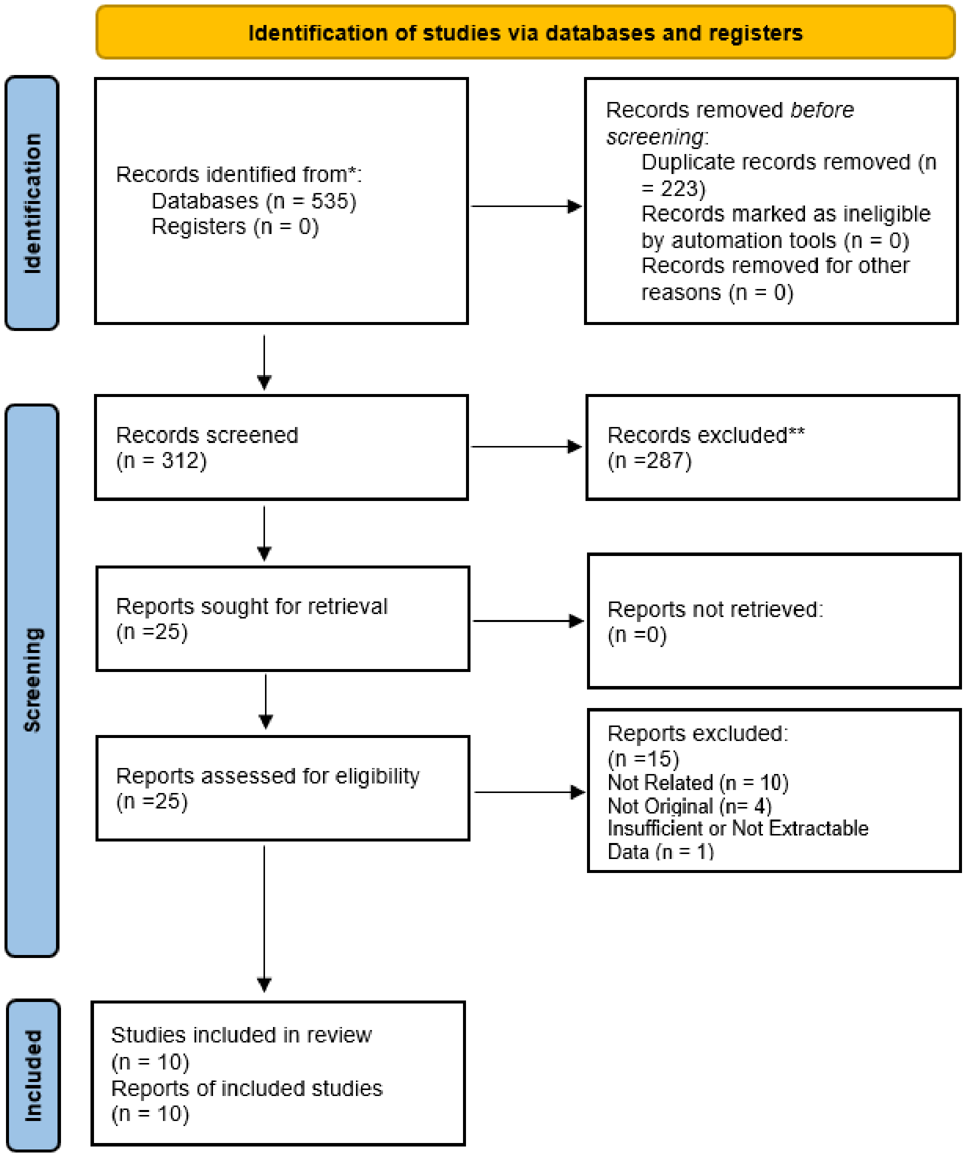


**Figure 1:** PRISMA flowchart of the included studies.

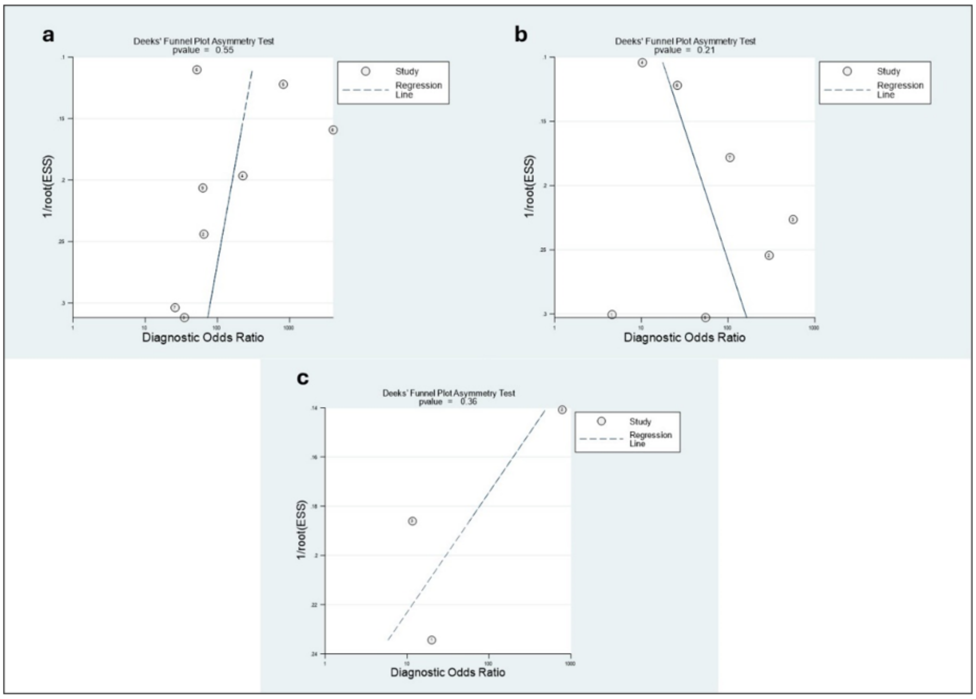


**Figure 2:** Deeks' funnel plots for publication bias evaluation; a. Based on the results of ATFL ligament; b. Based on the results of CFL ligament; c. Based on the results of AITFL ligament. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

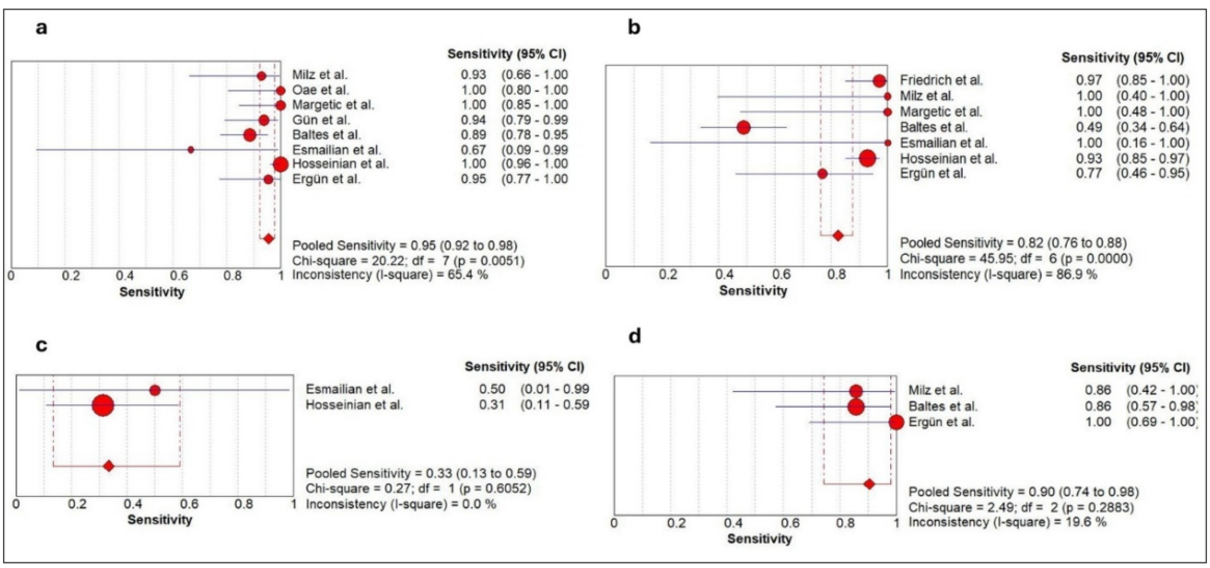


**Figure 3:** Pooled sensitivity of ultrasonography for diagnosing injuries of four ligaments: a. ATFL; b. CFL; c. PTFL; d. AITFL. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

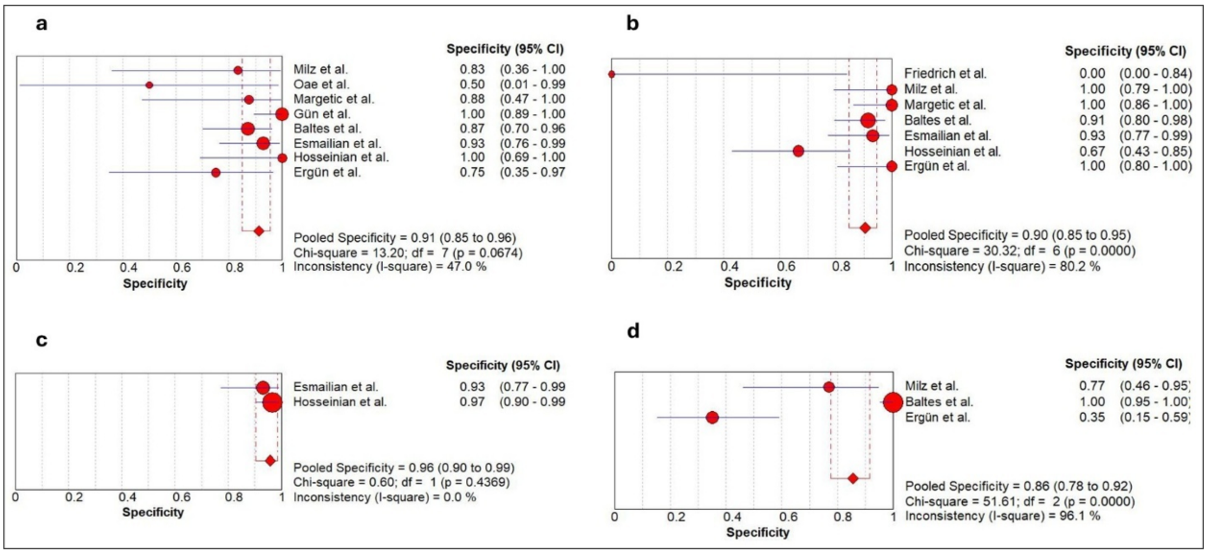


**Figure 4:** Pooled specificity of ultrasonography for diagnosing injuries of four ligaments: a. ATFL; b. CFL; c. PTFL; d. AITFL. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

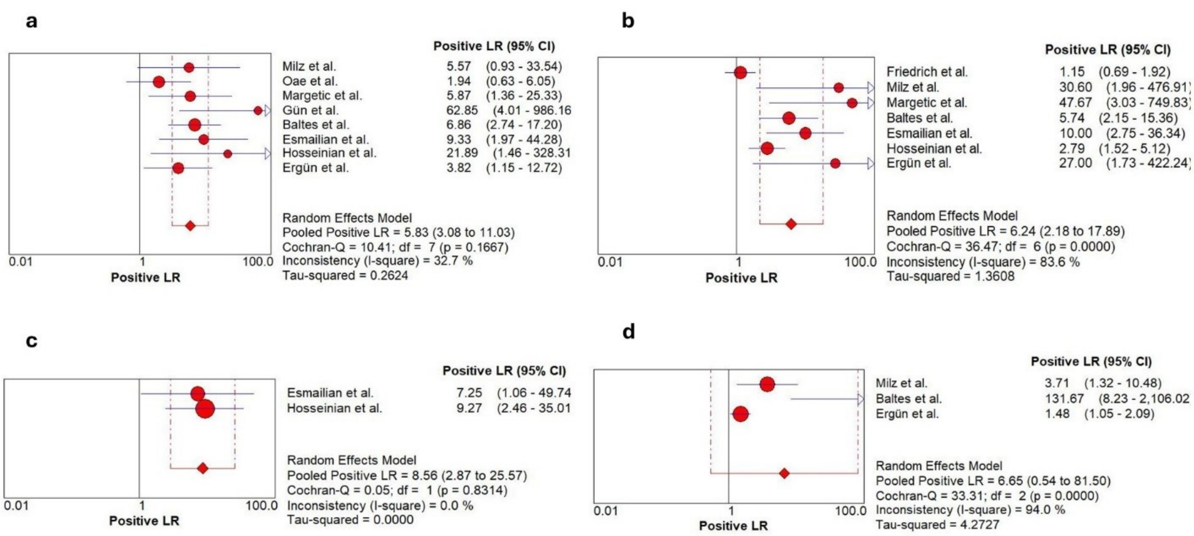


**Figure 5:** Pooled PLR of ultrasonography for diagnosing injuries of four ligaments: a. ATFL; b. CFL; c. PTFL; d. AITFL. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

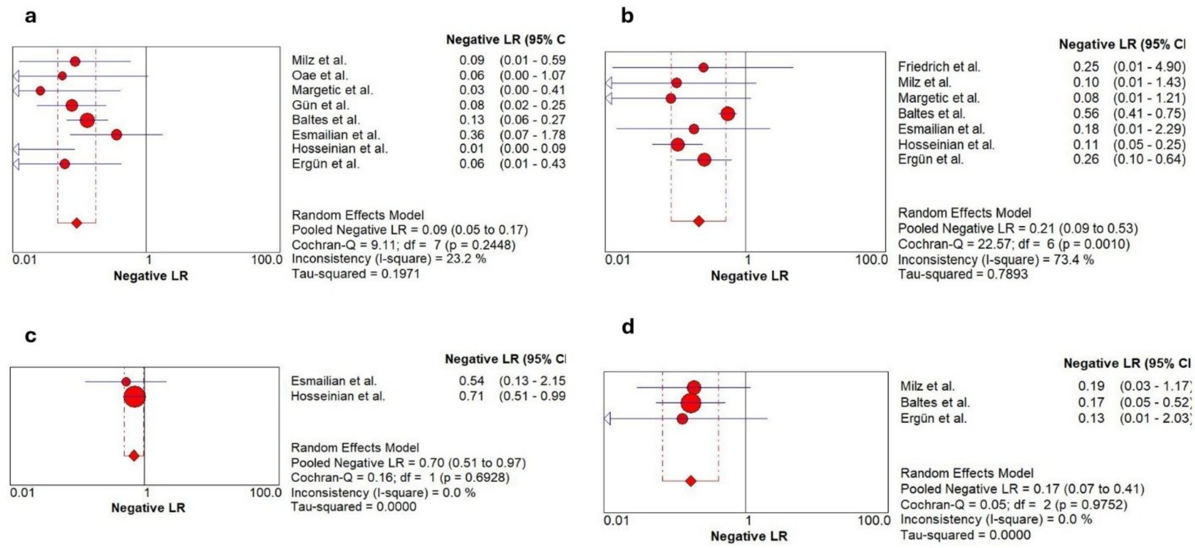


**Figure 6:** Pooled NLR of ultrasonography for diagnosing injuries of four ligaments: a. ATFL; b. CFL; c. PTFL; d. AITFL. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

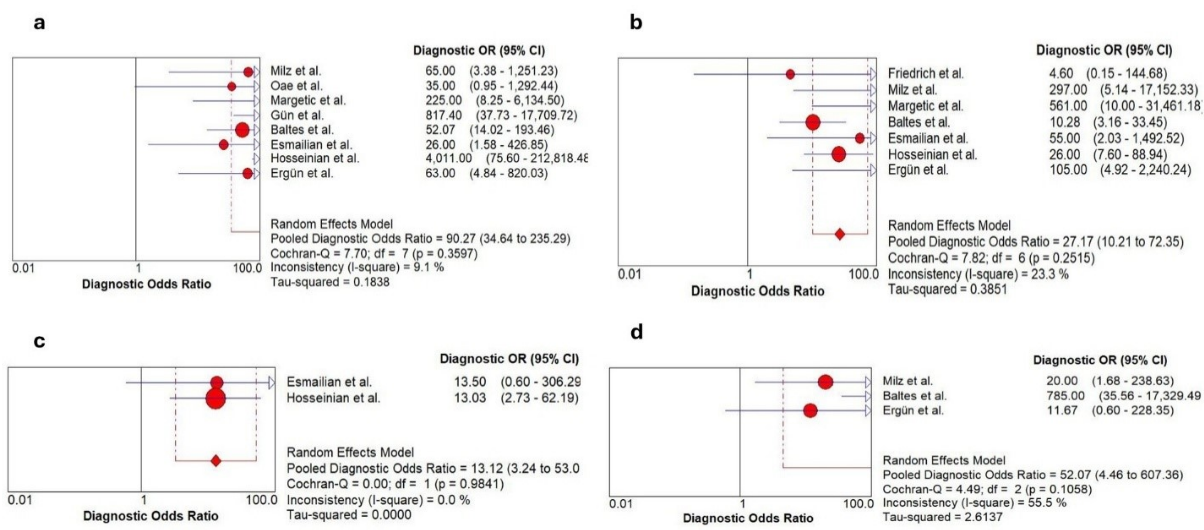


**Figure 7:** Pooled DOR of ultrasonography for diagnosing injuries of four ligaments: a. ATFL; b. CFL; c. PTFL; d. AITFL. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

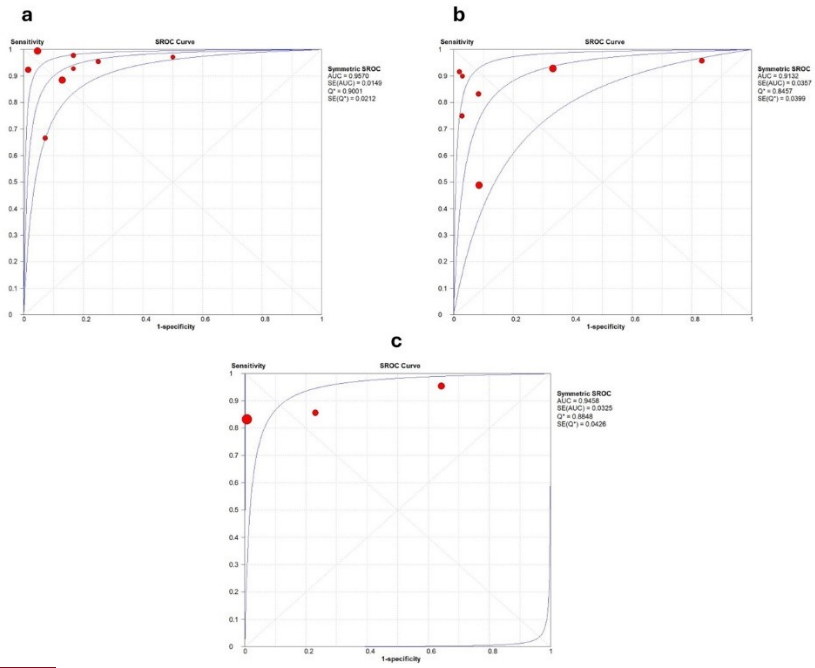


**Figure 8:** SROC plots; a. Based on the results of ATFL ligament; b. Based on the results of CFL ligament; c. Based on the results of AITFL ligament. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

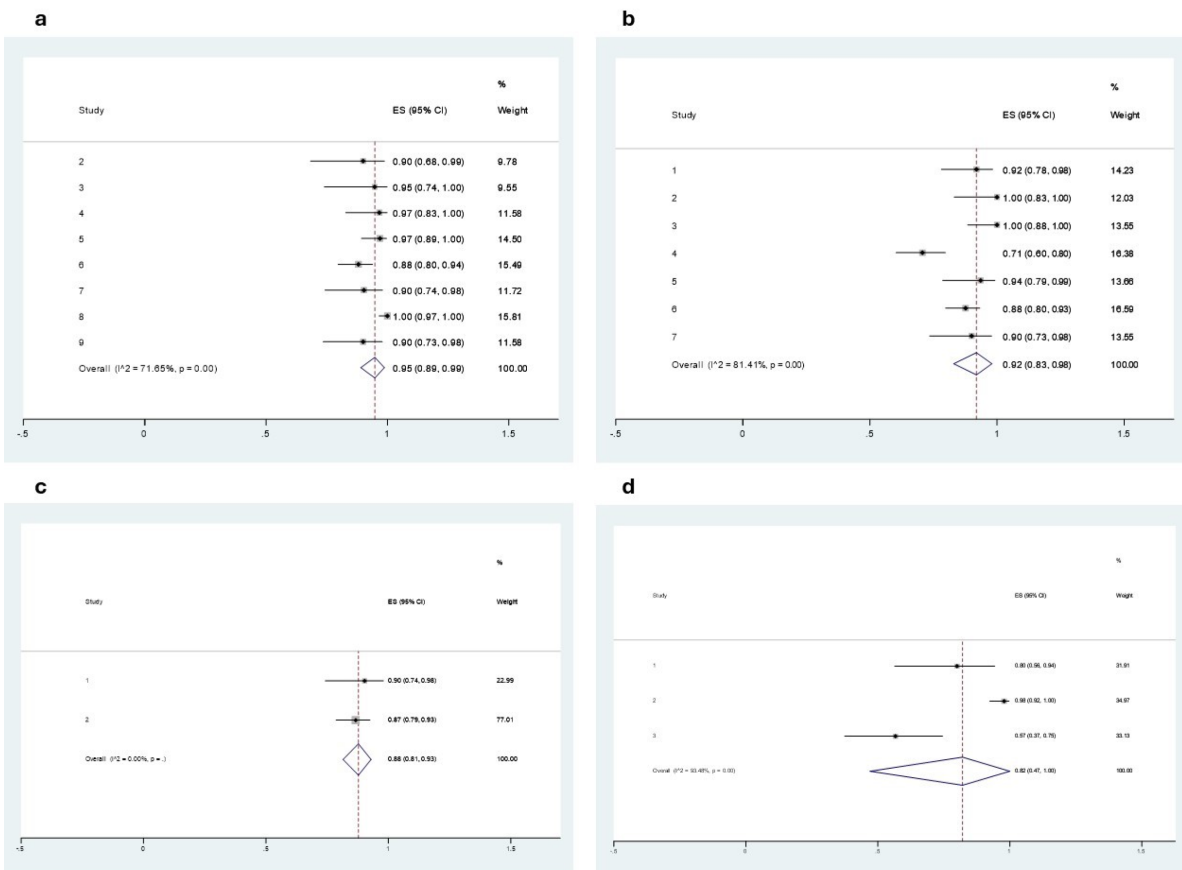


**Figure 9:** Pooled diagnostic accuracy of ultrasonography for injuries of four ligaments: a. ATFL; b. CFL; c. PTFL; d. AITFL. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament; PTFL: Posterior Talofibular Ligament; AITFL: Anterior Inferior Tibiofibular Ligament.

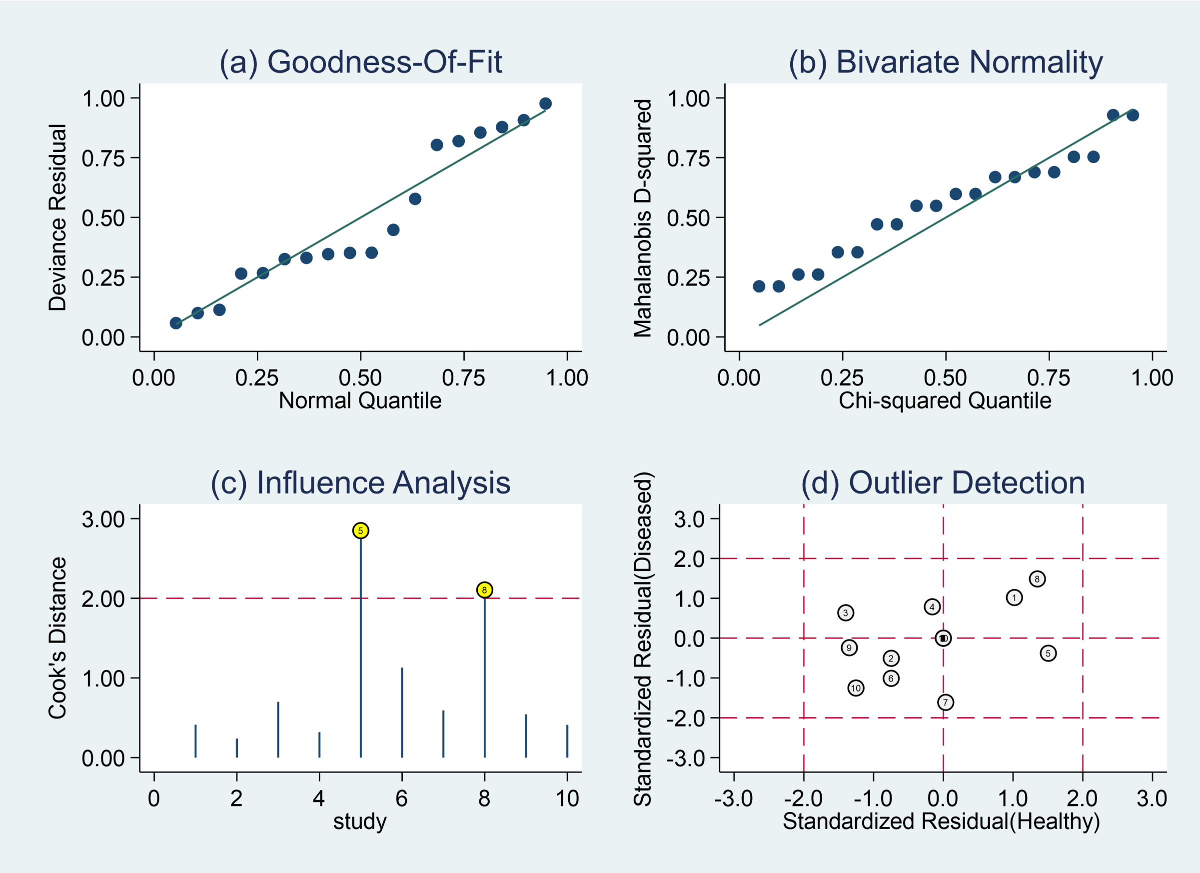


**Figure 10:** Goodness of fit, bivariate normality, influence analysis, and outlier detection plots based on the results of ATFL injuries. ATFL: Anterior Talofibular Ligament.

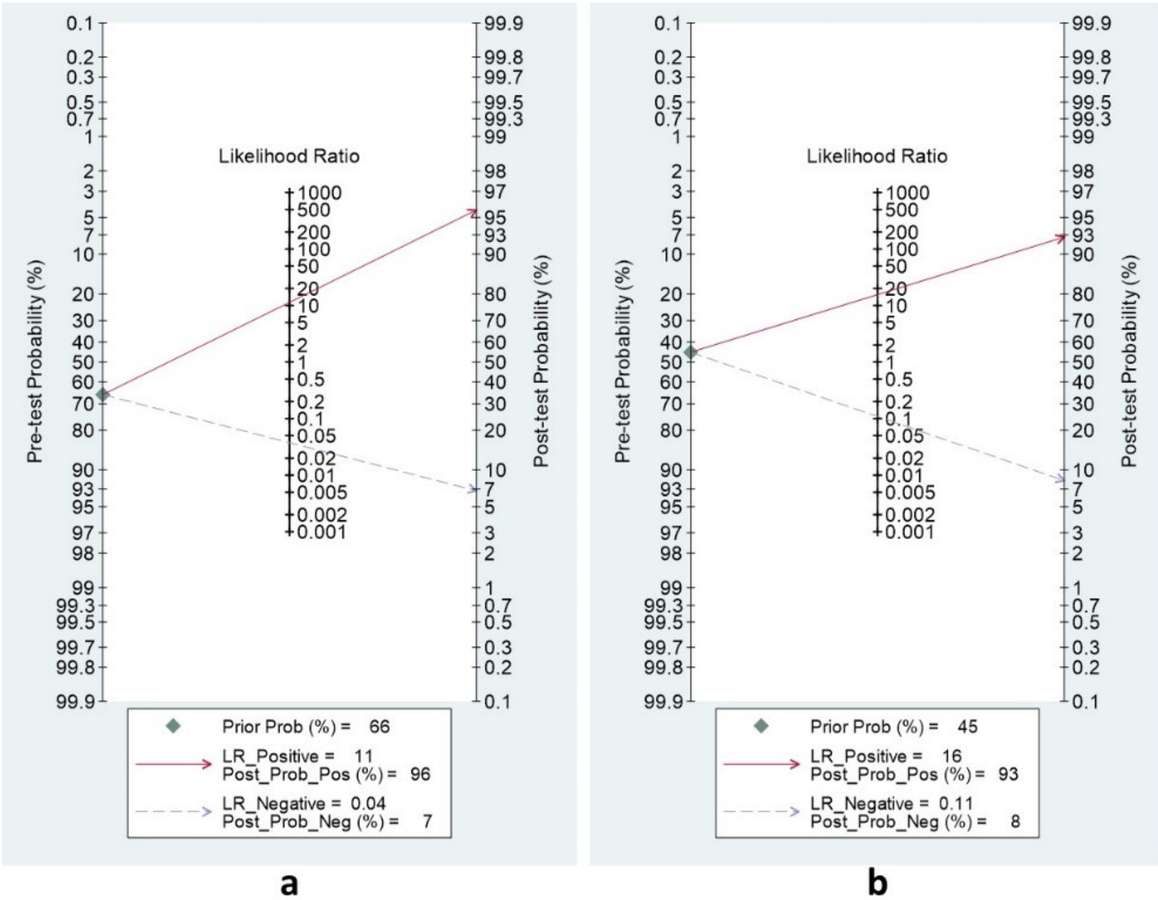


**Figure 11:** Fagan plot for investigating the clinical applicability of ultrasonography for diagnosis of injuries of ATFL (a) and CFL (b). ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament.

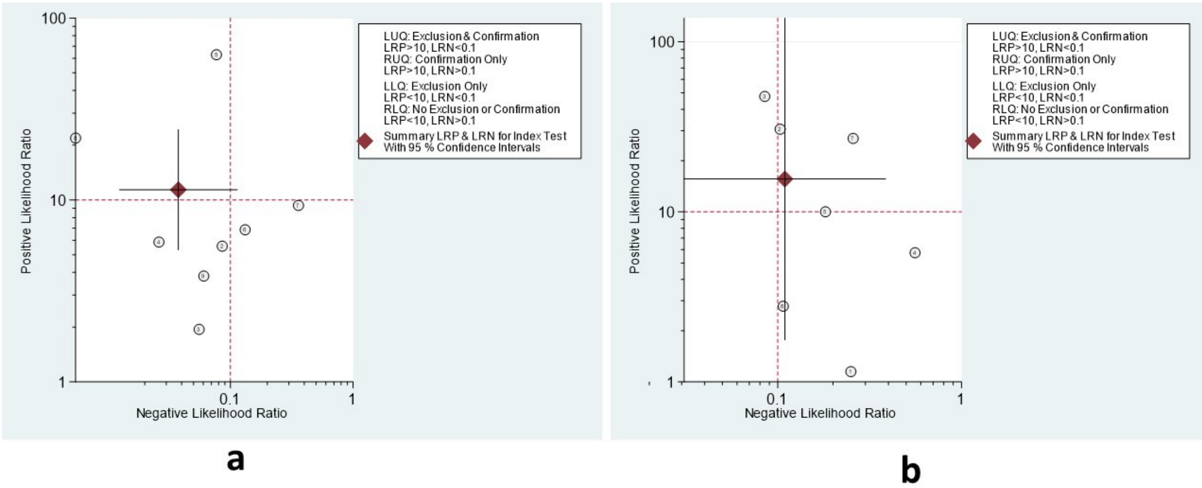


**Figure 12:** The likelihood ratio scattergram of ultrasonography for diagnosis of injuries of ATFL (a) and CFL (b). ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament.

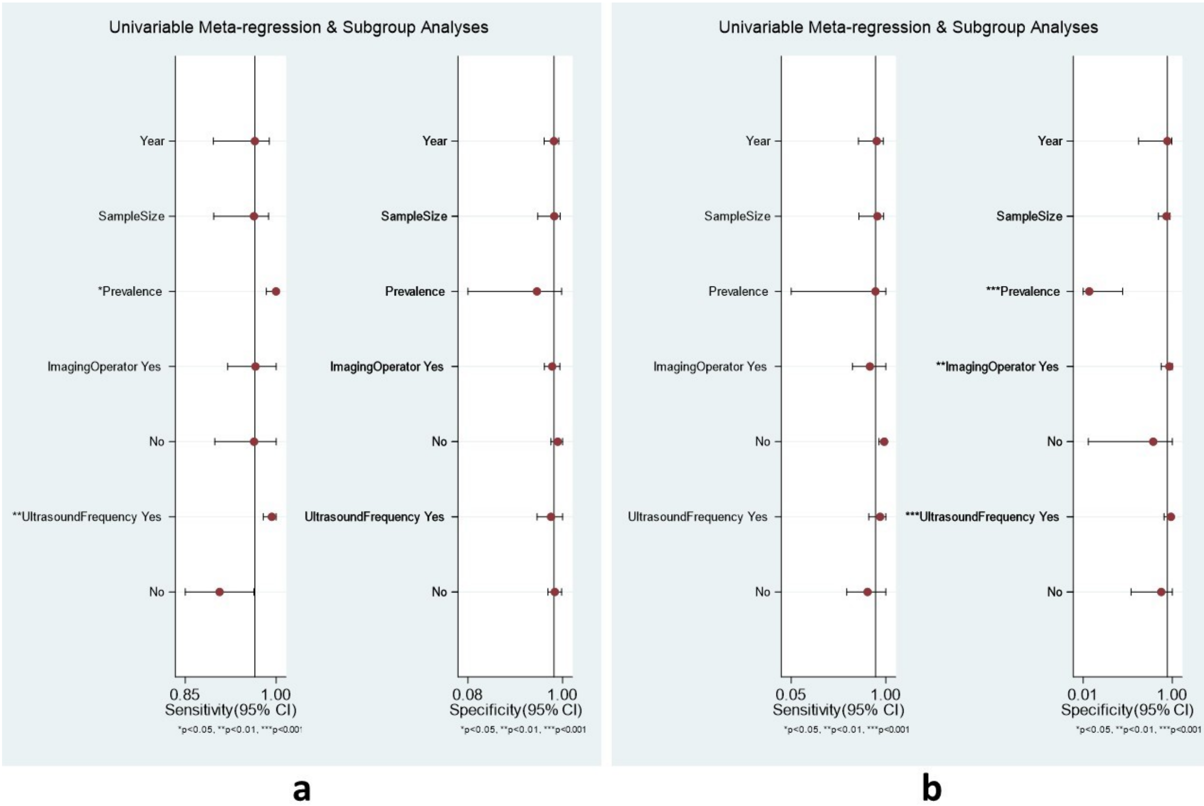


**Figure 13:** Forest plot of multiple univariable meta-regression and subgroup analyses for ATFL (a) and CFL (b). “Ultrasonography frequency—Yes” refers to studies that used ultrasonography with ≥9 MHz, and “Imaging operator—Yes” refers to studies in which ultrasonography was performed by a radiologist. ATFL: Anterior Talofibular Ligament; CFL: Calcaneofibular Ligament.

**Supplementary table 1:** The search strategy in different databases

| |
|---|
| **PubMed; Date of Search: 2026-04-17; Number of documents: 193** |
| #1<br>(((((((((Ultrasonography[MeSH Terms]) OR (Focused Assessment with Sonography for Trauma[MeSH Terms])) OR (Ultrasonics[MeSH Terms])) OR (ultrasonogra*[Title/Abstract])) OR (sonogra*[Title/Abstract])) OR (ultrasound*[Title/Abstract])) OR (ultrasonic*[Title/Abstract])) OR (POCUS[Title/Abstract])) OR ("point of care ultrasound"[Title/Abstract])) OR ("point of care ultrasonography"[Title/Abstract])) OR ("point-of-care ultrasound"[Title/Abstract])<br>#2<br>((((((((((Lateral Ligament, Ankle[MeSH Terms]) OR ("anterior talofibular ligament"[Title/Abstract])) OR (ATFL[Title/Abstract])) OR ("calcaneofibular ligament"[Title/Abstract])) OR (CFL[Title/Abstract])) OR ("posterior talofibular ligament"[Title/Abstract])) OR (PTFL[Title/Abstract])) OR ("Anterior Inferior Tibiofibular Ligament"[Title/Abstract])) OR (AITFL[Title/Abstract])) OR ("Delta Ligament"[Title/Abstract])) OR ("lateral ankle ligament"[Title/Abstract])<br>#3<br>((((((((Diagnosis[MeSH Terms]) OR (Early Diagnosis[MeSH Terms])) OR (Sensitivity and Specificity[MeSH Terms])) OR ("Diagnosis"[Title/Abstract])) OR ("Detection"[Title/Abstract])) OR ("Identification"[Title/Abstract])) OR ("Diagnostic"[Title/Abstract])) OR ("Accuracy"[Title/Abstract])) OR ("Sensitivity"[Title/Abstract])) OR ("Specificity"[Title/Abstract])<br>#4<br>#1 AND #2 AND #3 |
| **Scopus; Date of Search: 2026-04-17; Number of documents: 195** |
| #1<br>TITLE-ABS-KEY (ultrasonogra* OR sonogra* OR ultrasound* OR ultrasonic* OR POCUS OR “point of care ultrasound” OR “point of care ultrasonography” OR "point-of-care ultrasound")<br>#2<br>TITLE-ABS-KEY ("anterior talofibular ligament" OR ATFL OR "calcaneofibular ligament" OR CFL OR "posterior talofibular ligament" OR PTFL OR "Anterior Inferior Tibiofibular Ligament" OR AITFL OR "Delta Ligament" OR "lateral ankle ligament")<br>#3<br>TITLE-ABS-KEY (“Diagnosis” OR “Detection” OR “Identification” OR “Diagnostic” OR “Accuracy” OR “Sensitivity” OR “Specificity”)<br>#4<br>#1 AND #2 AND #3 |
| **Web of Science; Date of Search: 2026-04-17; Number of documents: 147** |
| #1<br>TS=(ultrasonogra* OR sonogra* OR ultrasound* OR ultrasonic* OR POCUS OR “point of care ultrasound” OR “point of care ultrasonography” OR "point-of-care ultrasound")<br>#2<br>TS=("anterior talofibular ligament" OR ATFL OR "calcaneofibular ligament" OR CFL OR "posterior talofibular ligament" OR PTFL OR "Anterior Inferior Tibiofibular Ligament" OR AITFL OR "Delta Ligament" OR "lateral ankle ligament")<br>#3<br>TS=(“Diagnosis” OR “Detection” OR “Identification” OR “Diagnostic” OR “Accuracy” OR “Sensitivity” OR “Specificity”)<br>#4<br>#1 AND #2 AND #3 |