Supplementary File S1

Section and Topic	Item #	Checklist item	Location where item is reported on page
TITLE			
Title	1	Identify the report as a systematic review.	1,3
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4,5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	5
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists, and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	6,7
Search strategy	7	Present the full search strategies for all databases, registers, and websites, including any filters and limits used.	6,7
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	7
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g., for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	7
	10b	List and define all other variables for which data were sought (e.g., participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	7
Effect measures	12	Specify for each outcome the effect measure(s) (e.g., risk ratio, mean difference) used in the synthesis or presentation of results.	7
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g., tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	7,8
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	7,8
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	7,8
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	7,8

Section and Topic	Item #	Checklist item	Location where item is reported on page
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g., subgroup analysis, meta-regression).	7,8
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	7,8
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	7,8
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	7,8
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	9,10
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	9,10
Study characteristics	17	Cite each included study and present its characteristics.	10
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	10
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g., confidence/credible interval), ideally using structured tables or plots.	10
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	10
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g., confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	10,11
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	11
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	11
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	10,11
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	12
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	12,13
	23b	Discuss any limitations of the evidence included in the review.	15
	23c	Discuss any limitations of the review processes used.	15
	23d	Discuss implications of the results for practice, policy, and future research.	15
OTHER INFORMATION			
Registration and	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	9

Section and Topic	Item #	Checklist item	Location where item is reported on page
protocol	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	9
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	9
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
Competing interests	26	Declare any competing interests of review authors.	N/A
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	N/A

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

Supplementary File S2. Searches strings

Search strategy defined for this study:

1. Search strategy for PubMed

URL: https://pubmed.ncbi.nlm.nih.gov

Filters: no filters were applied.

#1	("open ankle arthrodesis"[All Fields] OR "open ankle"[All Fields] OR "ankle joint/surgery"[MeSH Major Topic])
#2	("arthroscopy"[All Fields] OR "arthroscopy technique"[All Fields] OR "arthrodesis"[All Fields] OR "minimally invasive"[All Fields])
#3	("fusion rate"[All Fields] OR "VAS"[All Fields] OR "blood loss"[All Fields] OR "AOFAS"[All Fields])
#4	#1 AND #2 AND #3

2. Search strategy for Web of Science

URL: https://www.webofscience.com/wos/alldb/basic-search

Filters: no filters were applied.

#1	("open ankle arthrodesis" OR "open ankle" OR "ankle joint/surgery")
#2	(Arthroscopy OR "arthroscopy technique" OR arthrodesis OR "minimally invasive")
#3	("fusion rate" OR VAS OR "blood loss" OR AOFAS)
#4	#1 AND #2 AND #3

3. Search strategy for Scopus

URL: https://www.scopus.com/home.uri

Filters: no filters were applied.

#1	("open ankle arthrodesis" OR "open ankle" OR "ankle joint/surgery")
#2	(Arthroscopy OR "arthroscopy technique" OR arthrodesis OR "minimally invasive")
#3	("fusion rate" OR VAS OR "blood loss" OR AOFAS)
#4	#1 AND #2 AND #3

Supplementary File S3. Risk of Bias and Grading of Recommendation Assessment, Development and Evaluation system.

The Cochrane Risk of Bias 2 (RoB 2) assessment scale was structured into a fixed set of domains of bias, focusing on different aspects of trial design, conducting, and reporting. A total of five domains were assessed: (D1) bias arising from the randomization process, (D2) bias due to deviations from intended interventions, (D3) bias due to missing outcome data, (D4) bias in measurement of the outcome, and (D5) bias in selection of the reported results. These categories were classified as “high risk of bias”, “low risk of bias”, and “some concerns”.

RoB 2 was considered in the interpretation of the results by applying the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. Briefly, the overall quality was rated as very high (data come from randomized controlled trial) or high (data come from non-randomized controlled trial but intervention study) and downgraded one level to moderate, low, or very low for each of the following limitations. The reason for downgrading the evidence is summarised in Table ##.

Reasons to downgrade the level of evidence.

Domain	Reason to downgrade the level of evidence
Imprecision	• If the conclusion about the effect magnitude would be altered based on the lower or upper boundary of the confidence interval. For example, if the mean effect was small, but the 95% confidence interval crossed the threshold for a trivial effect (i.e., OR > 0.90), the precision was insufficient to support a strong recommendation the confidence interval does not exclude the possibility for the effect to be trivial. Similarly, if the confidence interval crossed the threshold for a large effect, while the mean effect was moderate, the conclusion was considered imprecise and as such, the level of evidence was also downgraded one level.
Inconsistency	• If large statistical heterogeneity was observed (e.g., $I^2 > 50\%$) when standardized mean differences were calculated.
Risk of bias	• If most studies rated as being at unclear risk of bias • Outcome includes studies that have been rated as being at high risk of bias in two or more categories

●●●●● Very High
●●●●○ High
●●●○○ Moderate
●●○○○ Low
●○○○○ Very Low

Supplementary File S4. Excluded studies with reasons.

Motive 1: Only arthroscopy surgery

1. Lopes, R., Andrieu, M., Cordier, G., Molinier, F., Benoist, J., Colin, F., Thès, A., Elkaïm, M., Boniface, O., Guillo, S., & Bauer, T. (2018). Arthroscopic treatment of chronic ankle instability: Prospective study of outcomes in 286 patients. *Orthopaedics & Traumatology, Surgery & Research : OTSR*, *104*, S199–S205.
2. Murawski, C. D., & Kennedy, J. G. (2010). Anteromedial impingement in the ankle joint: Outcomes following arthroscopy. *The American Journal of Sports Medicine*, *38*, 2017–2024.

Motive 2: no fusion rate provided.

1. DeVries, J. G., Scharer, B. M., & Romdenne, T. A. (2019). Ankle stabilization with arthroscopic versus open with suture tape augmentation techniques. *The Journal of Foot and Ankle Surgery*, *58*(1), 57–61.
2. Schmid, T., Krause, F., Penner, M. J., Veljkovic, A., Younger, A. S., & Wing, K. (2017). Effect of preoperative deformity on arthroscopic and open ankle fusion outcomes. *Foot & Ankle International*, *38*(12), 1301–1310.
3. Xu, C., Li, M., Wang, C., & Liu, H. (2020). A comparison between arthroscopic and open surgery for treatment outcomes of chronic lateral ankle instability accompanied by osteochondral lesions of the talus. *Journal of Orthopaedic Surgery and Research*, *15*, 113-undefined.
4. Cottom, J. M., Baker, J., & Plemmons, B. S. (2018). Analysis of Two Different Arthroscopic Broström Repair Constructs for Treatment of Chronic Lateral Ankle Instability in 110 Patients: A Retrospective Cohort Study. *The Journal of Foot and Ankle Surgery : Official Publication of the American College of Foot and Ankle Surgeons*, *57*, 31–37.
5. Rigby, R. B., & Cottom, J. M. (2019). A comparison of the 'All-Inside' arthroscopic Broström procedure with the traditional open modified Broström-Gould technique: A review of 62 patients. *Foot and Ankle Surgery : Official Journal of the European Society of Foot and Ankle Surgeons*, *25*, 31–36.

Motive 3: book

1. Dujela, M. D., & Hyer, C. F. (n.d.). *Ankle Arthrodesis: Open Anterior and Arthroscopic Approaches* (pp. 275–290).

Motive 4: other reasons

1. Anderson, T., Maxander, P., Rydholm, U., Besjakov, J., & Carlsson, A. (2005). Ankle arthrodesis by compression screws in rheumatoid arthritis: Primary nonunion in 9/35 patients. *Acta Orthopaedica*, *76*, 884–890.
2. Holt, E. S., Hansen, S. T., Mayo, K. A., & Sangeorzan, B. J. (1991). Ankle arthrodesis using internal screw fixation. *Clinical Orthopaedics and Related Research*, 21–28.