PRISMA 2020 checklist

Free Superficial Circumflex Iliac Artery Perforator (SCIP) Flap Reconstruction of the Hand and Upper Extremity: A Systematic Review

Locations refer to the supplied Review_Dan.docx (26 rendered pages). Section, table and figure references remain applicable if pagination changes. Reporting gaps and analyses not performed are identified explicitly.

Section and Topic	Item #	Checklist item	Location and reporting details
TITLE			
Title	1	Identify the report as a systematic review.	Title, p. 1: identifies the report as a systematic review.
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Abstract, p. 1. OSF is named; the registration identifier and primary funding source are not stated in the abstract.
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Section 1, Introduction, pp. 1–3: clinical context, previous reviews and the need for upper-extremity-specific evidence.
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Section 1, final paragraph, p. 3: objective and PICO review question.
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Section 2.2, p. 4: inclusion/exclusion criteria and overlapping cohorts. Section 2.5, p. 6: synthesis groups.
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.	Section 2.3, pp. 4–5: PubMed, Europe PMC and reference-list searches; electronic search date 14 September 2026. A separate date for reference-list checking is not stated.
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Section 2.3, pp. 4–5: terms, fields, concept blocks and limits. Complete verbatim strategies for each database and supplementary search are not supplied.
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.	Section 2.4, pp. 5–6: two authors, screening stages and full-text assessment; no AI selection. Independent duplicate decisions are not documented (Section 4.6, p. 22).
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.	Section 2.4, pp. 5–6: piloted form, two authors, source verification, no unpublished-data requests or AI extraction. Independent duplicate extraction is not documented (Section 4.6).

Section and Topic	Item #	Checklist item	Location and reporting details
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.	Sections 2.1 and 2.4, pp. 3–6: outcomes sought. Outcome definitions and rules for selecting among multiple measures/time points are not fully specified.
	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.	Section 2.4, pp. 5–6: study, patient and technical variables; mixed-site data labelled; missing values entered as NR without imputation. Table footnotes give additional conventions.
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.	Section 2.5, p. 6: JBI case-series checklist, RoB 2 and single-reviewer appraisal. Section 2.4 states no AI quality appraisal.
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.	Section 2.5, p. 6: counts, denominators, ranges and descriptive aggregates, with flap/patient units. Section 3.4 and Table 3 report event proportions and instrument scores; no pooled effect estimates.
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)).	Sections 2.2 and 2.5, pp. 4 and 6: extractable upper-extremity outcomes, grouping by flap variant/recipient region and analysis units; Section 3.1, p. 7: overlap handling.
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Sections 2.2, 2.4–2.5 and 3.1, pp. 4–7: missing data, mixed-site attribution, denominators and duplicate-cohort handling; Tables 1–3 footnotes explain derived values.
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Sections 2.1 and 2.5, pp. 3–4 and 6: planned tables and tabulation. Tables 1–3, pp. 9–10, 12–14 and 16–17.
	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.	Sections 2.1 and 2.5, pp. 3–4 and 6: structured narrative synthesis, descriptive summaries and rationale for not undertaking meta-analysis.
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	Section 2.5, p. 6: descriptive exploration by flap variant, recipient region and patient characteristics; no subgroup effect estimates or meta-regression.
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	Not performed, as explicitly stated in Section 2.5, p. 6; limitation acknowledged in Section 4.6, p. 22.
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	No formal reporting/publication-bias assessment was performed (Section 2.5, p. 6). Potential publication, language and availability biases are discussed in Section 4.6, pp. 21–22.

Section and Topic	Item #	Checklist item	Location and reporting details
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	No formal outcome-level certainty assessment was performed (Section 2.5, p. 6); acknowledged in Section 4.6, p. 22.
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.	Section 3.1, pp. 6–7, and Figure 1, p. 8: identification, screening, retrieval, exclusion and inclusion counts.
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Section 3.1, p. 7: excluded reports cited by reason [9,10,28–41]; two unretrieved reports [26,27] identified separately. Figure 1, p. 8.
Study characteristics	17	Cite each included study and present its characteristics.	Sections 3.2–3.3, pp. 9–15; Tables 1 and 2, pp. 9–10 and 12–14: citations, study/patient characteristics and technical details.
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Table 3, pp. 16–17, and Section 3.5, pp. 18–19: per-study JBI totals and overall RoB 2 judgement. Full item-level/domain-level judgements are not tabulated.
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.	Section 3.4 and Table 3, pp. 16–18: per-study counts, proportions and functional/sensory/aesthetic summaries. Precision estimates and complete comparator-arm summaries are not reported.
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Sections 3.2–3.5, pp. 9–19, and Tables 1–3: characteristics and quality of contributing studies. Separate risk-of-bias summaries for each synthesis are not provided.
	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.	Section 3.4, pp. 16–18: descriptive aggregate counts/proportions and study ranges. No meta-analysis, pooled precision estimates or statistical heterogeneity estimates.
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Sections 3.3–3.4, pp. 12–18, and 4.3–4.4, pp. 20–21: descriptive differences by technique, patient factors and outcome reporting. No formal subgroup analyses or meta-regression.
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	Not performed; no sensitivity-analysis results. See Section 2.5, p. 6, and Section 4.6, p. 22.
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	No formal reporting-bias assessments; therefore no assessment results. See Sections 2.5 and 4.6, pp. 6 and 21–22.

Section and Topic	Item #	Checklist item	Location and reporting details
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	No formal outcome-level certainty assessments; therefore no certainty ratings. See Sections 2.5 and 4.6, pp. 6 and 22.
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Sections 4.1–4.4, pp. 19–21: interpretation and comparison with previous reviews and primary studies.
	23b	Discuss any limitations of the evidence included in the review.	Section 4.6, pp. 21–22: study design, heterogeneity, follow-up, outcome reporting, overlap and generalisability; also Sections 4.2–4.4.
	23c	Discuss any limitations of the review processes used.	Section 4.6, pp. 21–22: search coverage, eligibility restrictions, unavailable reports, reviewer processes and assessments not performed.
	23d	Discuss implications of the results for practice, policy, and future research.	Sections 4.5–4.7, pp. 21–22, and Section 5, p. 22: practice implications, prospective comparisons, registry and standardised outcomes.
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Section 2.1, pp. 3–4, and Data Availability Statement, p. 23: Open Science Framework (OSF), https://osf.io/y7nb8.
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Section 2.1, pp. 3–4: written protocol. Data Availability Statement, p. 23, identifies the protocol URL as https://osf.io/y7nb8.
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	Section 2.1, p. 3: protocol followed except where explicitly noted in Results. Amendments and their reasons are not separately itemised.
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Funding and Acknowledgments, p. 23: university payment of the article processing charge and AI language/formatting assistance. Review funding and the funder's role are not explicitly stated.
Competing interests	26	Declare any competing interests of review authors.	Conflicts of Interest, p. 23: none declared.
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.	Data Availability Statement, p. 23: extracted information in Tables 1–3, source reports in References, OSF protocol link. Availability of extraction forms and analytic code is not stated.

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 Materials

The following supplementary tables accompany the manuscript and will be provided as a separate file at submission.

Table S1. Studies contributing to each descriptive outcome aggregate.

Outcome	Aggregate, n/N (%)	Studies contributing to numerator and denominator [ref]	Excluded: whole-cohort value with events not attributable to UE flaps, or overlapping cohort [ref]	Excluded: outcome not reported [ref]
Total flap loss	7/438 (1.6)	All 33 studies; [43] contributes its two non-overlapping flaps	None	None
Partial necrosis	7/363 (1.9)	[12–15,42–47,49–56,58–65,67,68]	[8,48,57]	[19,66]
Vascular compromise or re-exploration	14/303 (4.6)	[12,14,42–50,52–56,58,59,61,62,66–68]	[19,51,57]	[8,13,15,60,64,65]
Secondary debulking	42/241 (17.4)	[12,44–47,49,51–55,61–65,67,68]	[43,60]	[8,13,14,15,19,42,48,50,56–59,66]
Donor-site complications	17/283 (6.0)	[14,15,43–47,49,50,52,54,55,58–61,64–68]	[19,42,48,53,57]	[8,12,13,51,56,62,63]

Abbreviations: n, number of events; N, number of upper-extremity flaps with attributable data; ref, reference; UE, upper extremity. Attribution rule (Section 2.5): a study contributes when the outcome is reported for its upper-extremity flaps or when no event occurred in its whole mixed-site cohort (superscript b in Table 2); whole-cohort values with events that cannot be located, and outcomes not reported, are excluded from both numerator and denominator. The overlapping series [43] contributes only its two non-overlapping flaps and only to outcomes in which it recorded no event; its three debulking procedures among 12 overlapping flaps cannot be assigned and are excluded. For [64] the debulking denominator is the nine surviving flaps and for [65] the donor-site denominator is 43 patients, as reported. For [45] the donor-site denominator is 11 patients, as reported.

Table S2. Technical characteristics of the flaps in the included studies.

Study [ref]	Flap variant	SCIA branch	Preoperative imaging	Flap area (cm²)	Thickness (mm)	Pedicle length (cm)	Artery diameter (mm)	Arterial anastomosis (E-E:E-S)	Veins per flap	Primary donor closure (%)
Chao et al. 2026 [62]	G, M (5), Ch (3)	NR	NR	46.8 (1.5–216)[a]	NR	NR	NR	NR	NR	NR
Kodaira et al. 2026 [56]	C	Sup	CTA	NR	NR	NR	1.28 (1.0–1.6)	6:0	1–2	NR
Moltaji et al. 2026 [14]	C	NR	Doppler ± US	68 (28–187)	NR	NR	NR	NR	1–2	100
Pan J et al. 2026 [44]	Ch (bone)	Deep	CDU	41.0 (13.5–77)[a]	NR	NR	NR	NR	NR	100
Yamamoto et al. 2026 [57]	C (SCIAt), M (21%)	SCIAt	ICG (49%)	129 (35–355)[a]	NR	11.9 (8–17)[a]	1.07 (0.6–1.7)[a]	34:23[a]	1–3	100
Ayad et al. 2025 [15]	C	Sup or Deep	Doppler	46.9 (9.2 × 5.1)	11.8 (7.5–15.5)	5.6 (4–6.7)	0.77 (0.5–1.2)	NR	NR	100
To et al. 2025 [65]	T, Ch (9), M (11), Co (2)	Sup + Deep	CTA	135 (17.8 × 7.6)	2.5 (2–4)	NR	NR	NR	≥2	100

Study [ref]	Flap variant	SCIA branch	Preoperative imaging	Flap area (cm²)	Thickness (mm)	Pedicle length (cm)	Artery diameter (mm)	Arterial anastomosis (E-E:E-S)	Veins per flap	Primary donor closure (%)
Tung et al. 2025 [63]	C (thinned)	Deep 5, Sup 2, SIEA 1	None	90 (13.5 × 6.7)[a]	NR	5.2[a]	NR	NR	1 (3 in one)	100
Zhang et al. 2025 [46]	G, Ch (10)	Tr	US	24–253	NR	4.0 (cadaver)	1.6 (cadaver)	10:32	1–2	100
Zhu et al. 2025 [45]	P	Sup 12, Deep 2	US 18 MHz	47.5 (11–98)	2.6 (2–3)	5.3 (3.2–7.7)	0.9 (0.5–1.2)	2:11	1–2	100
Chu T et al. 2024 (chimeric) [49]	Ch (bone + fascia)	Sup + Deep	None	3–6 (thumb paddles)	NR	NR	NR	NR	1	100
Chu T et al. 2024 (multipaddle) [48]	M (2–4 paddles)	Tr (95%)	US	30–380[a]	NR	NR	NR	mostly E-S	NR	100
Wang et al. 2024 [47]	Co (SCIA + L4/PICA)	Sup + second pedicle	Doppler	351 (30.3 × 11.6)	NR	NR	NR	NR	2–3	100
Jain et al. 2023 [64]	C, S (3)	Sup	CTA + CDU	144 (8 × 18)	NR	NR	NR	NR	2	100
Ou et al. 2023 [50]	T, S, M (20)	Sup/Tr	CDU + CTA	36 (6.5 × 5.5)	5 (4–8)	NR	NR	41:0	1–2	100
Tatar & Erçin 2023 [66]	C	NR	US	13.6 (± 7.3)	NR	NR	NR	11:0	1	NR
Yamamoto 2023 [58]	C	Sup	None	60–112	NR	NR	0.5–1.0	6:2	1–2	NR
Yoshimatsu et al. 2023 [59]	C	NR	ICG	168 (17.2 × 9.8)	NR	2.8 (2–4)	1.5 (1.2–1.8)	6:0	1–2	NR
Han et al. 2022 [51]	G	Sup + Deep	Doppler	24–234	11 (8–15)	NR	NR	retrograde E-E	1	100
Hussain et al. 2022 [67]	G	Tr	Doppler	66 (10.2 × 6.5)	NR	NR	NR	NR	1	100
Yamamoto et al. 2021 [13]	P, M (2)	Sup 3, Deep 3	CDU	15–128	1.0–2.5	4.5–11	NR	NR	NR	NR
Berner et al. 2020 [19]	C 16, Ch 2, M 1, other 1[a]	Sup	Doppler	8–350[a]	NR	≤8[a]	NR	E-S preferred	1–2	100
Li et al. 2020 [52]	M (bilobed)	NR	CDU + CTA	4–7 per lobe	NR	NR	NR	NR	NR	100
Pan Z et al. 2020 [53]	S, Ch (4)	Deep	US	32–136	3–6 (defatted)	5 (4–6)	NR	14:1[a]	1–2	100
Yoshimatsu et al. 2019 [60]	C 5, S 2, Ch 3, bone 1	Deep	Doppler	14–147	NR	3–8	1.0 (0.6–2.0)[a]	NR	NR	100

Study [ref]	Flap variant	SCIA branch	Preoperative imaging	Flap area (cm²)	Thickness (mm)	Pedicle length (cm)	Artery diameter (mm)	Arterial anastomosis (E-E:E-S)	Veins per flap	Primary donor closure (%)
Pan ZH et al. 2017 [54]	Ch (bone) + ALT	NR	Doppler	20–105	NR	NR	NR	E-E to ALT pedicle	NR	100
Chao et al. 2016 [43]	G, M (8), Ch (4)	3–4 branches	Doppler (some)	9–176	NR	NR	NR	NR	1	100
Narushima et al. 2016 [12]	P	Sup 4, Tr 1	CDU + ICG	46.3 (16–84)	2.1 (2–2.5)	5.2 (2–9)	0.8 (0.7–1.0)	3:1 (+2 flow-through)	1–3	NR
Yoshimatsu et al. 2016 [61]	C 7, Ch 1, S 1	Sup 20, Deep 3, both 4[a]	Doppler	10–224	NR	2–10	1.0 (0.5–2.0)[a]	5:3 (+1 both)	≥1	100
Chao et al. 2015 [42]	G, M (7), S (4), Ch (3)	2–4 branches	Doppler (not routine)	1.5–216	NR	NR	0.5–0.8 (branches)	NR	1	100
Kim et al. 2015 [68]	T	Sup 41, Deep 11[a]	Doppler	75 (24–140)[a]	5 (3–8)[a]	4.5 (2.5–5.5)[a]	0.7 (0.5–1.0)[a]	5:47[a]	≥1	100
Pan ZH et al. 2013 [55]	G, Ch (3)	Deep (+Sup 1)	Doppler	89.3 (50–150)	NR	3.2 (2.6–5)	NR	8:0	1–2	100
Hsu et al. 2007 [8]	C, M (2)	Sup or Deep	Doppler	24–200[a]	5–20[a]	3–13[a]	0.8–1.8[a]	NR	1	NR

Abbreviations: ALT, anterolateral thigh flap; C, conventional SCIP flap; CDU, colour Doppler ultrasonography; Ch, chimeric or osteocutaneous flap; Co, compound dual-pedicle flap; CTA, computed tomographic angiography; Deep, deep branch; E-E, end-to-end; E-S, end-to-side; G, groin-type non-thinned flap on an identified SCIA pedicle; ICG, indocyanine green angiography; L4, fourth lumbar artery perforator; M, multi-paddle or bilobed flap; NR, not reported; P, pure skin perforator flap; PICA, posterior intercostal artery perforator; ref, reference; S, sensate flap; SCIA, superficial circumflex iliac artery; SCIAt, transverse branch of the SCIA; SCIP, superficial circumflex iliac artery perforator; SIEA, superficial inferior epigastric artery; Sup, superficial branch; T, thin or super-thin suprafascial flap; Tr, SCIA trunk; US, ultrasonography. Units: cm, centimetres; cm², square centimetres; MHz, megahertz; mm, millimetres. Variant counts appear in parentheses. Area is mean (range) or range; mean length × width is shown where given. Other dimensions are mean (range) or range. Superscript a, whole mixed-site cohort value.