

Supplementary Material

Table i. Studies assessed which particular imaging characteristics.

Variable	X-ray study	CT study
Diagnostic characteristics union	Farracho, Hannermann 2015	Farracho, Buijze, Hannermann 2013
Reliability union	Farracho, Hannermann 2015, Dias 1988, Matzon, Singh 0.543, 0.583, 0.386, 0.53, 0.27	Farracho, Buijze, Hannermann 2013, Geoghegan, Grewal, Hannermann 2014, Drijkoningen 0.641, 0.66, 0.683, 0.77, 0.71, 0.683, 0.34
Reliability nonunion	Hannermann 2015	Hannermann 2013, Hannermann 2014
Reliability partial union	Hannermann 2015	Hannermann 2013

Table ii. Assessment of union methods, observer details, and reference standards.

Author, yr	Assessment of union method	Observers, n	Details of observers	Details of union assessment	Union rate	Reference standard
Buijze 2012	CT scan (1.25mm cuts 1mm intervals)- in long axis of scaphoid (Sanders 1988)	59	Fully trained orthopaedic hand and trauma surgeons	United or ununited (no specific definition used)	Not reported	Nonunion: operatively verified ununited scaphoid waist Union: united on X-rays obtained a minimum of 6 months after injury
Dias 1988	X-rays (at least 4 views)	8	Four orthopaedic consultants and four consultants in radiology.	Has the fracture united? Are there trabeculae crossing the fracture line?	Not reported	N/A
Dias 2020	CT scan Scaphoid series X-rays (PA, lateral, semisupine, semiprone, elongated)	3	Unknown	CT: Union was defined as complete disappearance of the fracture line on X-rays and complete bridging Partial union: proportion of fracture plane traversed by bridging trabeculae on true sagittal and coronal multiplanar reconstructions. Nonunion	Not reported	N/A
Drijkoningen 2018	CT scan in plane of scaphoid (1.25mm cuts)	145	Surgeon who felt it appropriate for their expertise and interests	The percentage of bony bridging was categorized according to Singh 2005. The location of the bony bridging was divided into anatomic areas, which included dorsal, volar, radial, and ulnar	Not reported	N/A
Farracho 2020	X-rays (AP, lat, Shreck views)	4	Two musculoskeletal radiologists	Union defined as 50% visibility threshold concerning trabecular bridges	70% at six weeks	radiological and clinical follow-up for all patients at two months

	Cone Beamed CT scan		and two hand surgeons			
Geoghegan 2009	CT scan in longitudinal axis of scaphoid (Sanders 1988)	2	Two experienced hand surgeons unaware of patients' outcome	Union defined as continuity of the trabecular pattern across at least 50% of the whole cross-section of the fracture.	89%	N/A
Grewal 2013	CT scan in long axis of scaphoid with 0.625mm cuts (Bain 1995)	4	Two consultant hand surgeons, a musculoskeletal radiologist, and a hand surgery fellow	Mean percentage union Weighted mean percentage union	Not reported	N/A
Hannemann 2013	CT scans in longitudinal axis of scaphoid with 1mm cuts (Sanders 1988) with multiplanar reconstructions	3	A senior consultant in orthopaedic trauma surgery, a senior musculoskeletal radiologist, and a senior radiology resident with a special interest in musculoskeletal radiology	Union: continuity of the trabecular pattern across the whole width of the scaphoid Partial union: visible gap across some of the fracture site, with presence of trabecular bridging in other areas Nonunion: visible gap across the whole fracture site with no sign of physiological restoration of bony architecture	Not reported	Union: presence of trabecular bridging on CT obtained at least 6 months after injury Nonunion: persistent gap across whole fracture site with no signs of restoration of trabecular bone pattern on CT obtained 6 to 12 months after the initial CT scan
Hannemann 2015	X-rays 4 views (PA, PA ulnar deviation, lateral and oblique semiprone)	4	Two senior orthopaedic trauma consultants and two radiologists with special interest in musculoskeletal radiology	Union was defined as signs of consolidation on at least three out of four views (Singh 2005) Partial union was defined as signs of consolidation on one or two views No union was defined as signs of consolidation on none of the views	87% at six months	Union: scaphoid XRs at minimum of six months after injury determining the presence of trabecular bridging Nonunion: persistent lucency determined by a senior orthopaedic trauma consultant and a musculoskeletal radiologist on XRs at minimum of six months after injury

Hannemann 2014	Multiplanar reconstructed CT in longitudinal axis of scaphoid with 1mm cuts (Sanders 1988)	2	Blinded observers	No union (0% to 24% of the continuity of the trabecular pattern (trabecular bridging) across the whole width of the scaphoid) Partial union (25% to 74% trabecular bridging) Union (75% to 100% trabecular bridging). Singh 2005	94%	N/A
Matzon 2021	Scaphoid X-rays (PA, lateral, oblique, ulnar deviation) CT scan in plane of scaphoid	3	Three fellowship-trained, orthopaedic hand surgeons	Healed, partially healed, and not healed. If partially healed % according to Singh 2005. Reviewer certainty	Not reported	N/A
Rossi 1995	Scaphoid X-rays (variable)	2	One observer was a fellow in musculoskeletal radiology and the other is a fellowship trained musculoskeletal radiologist	Whether a linear lucency was present in each of six zones around the graft and fracture line bridging using a three-point grading scale	100%	N/A
Singh 2005	CT scan in longitudinal axis of scaphoid with 1mm cuts(Sanders 1998) Scaphoid X-rays	1 for CT 2 for X-rays	Consultant hand surgeon and senior trainee	Union: continuity of the trabecular pattern across the whole width of the scaphoid. Partial union: visible gap across some of the fracture site, although trabecular bridging in other areas. The extent of union of the fracture on each CT slice was graded as 0% to 24%, 25% to 49%, 50% to 74% or 75% to 99%.	Overall 86%	N/A

Table iii. PRISMA DTA statement.

Section/topic	#	PRISMA-DTA Checklist Item	Reported on page #
TITLE / ABSTRACT			
Title	1	Identify the report as a systematic review (+/- meta-analysis) of diagnostic test accuracy (DTA) studies.	1
Abstract	2	Abstract: See PRISMA-DTA for abstracts.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	2
Clinical role of index test	D1	State the scientific and clinical background, including the intended use and clinical role of the index test, and if applicable, the rationale for minimally acceptable test accuracy (or minimum difference in accuracy for comparative design).	2
Objectives	4	Provide an explicit statement of question(s) being addressed in terms of participants, index test(s), and target condition(s).	2
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	3
Eligibility criteria	6	Specify study characteristics (participants, setting, index test(s), reference standard(s), target condition(s), and study design) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	3
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	3
Search	8	Present full search strategies for all electronic databases and other sources searched, including any limits used, such that they could be repeated.	3
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	3
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	3
Definitions for data extraction	11	Provide definitions used in data extraction and classifications of target condition(s), index test(s), reference standard(s) and other characteristics (e.g. study design, clinical setting).	4
Risk of bias and applicability	12	Describe methods used for assessing risk of bias in individual studies and concerns regarding the applicability to the review question.	4
Diagnostic accuracy measures	13	State the principal diagnostic accuracy measure(s) reported (e.g. sensitivity, specificity) and state the unit of assessment (e.g. per-patient, per-lesion).	4
Synthesis of results	14	Describe methods of handling data, combining results of studies and describing variability between studies. This	4

		could include, but is not limited to: a) handling of multiple definitions of target condition. b) handling of multiple thresholds of test positivity, c) handling multiple index test readers, d) handling of indeterminate test results, e) grouping and comparing tests, f) handling of different reference standards	
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