

Supplementary data

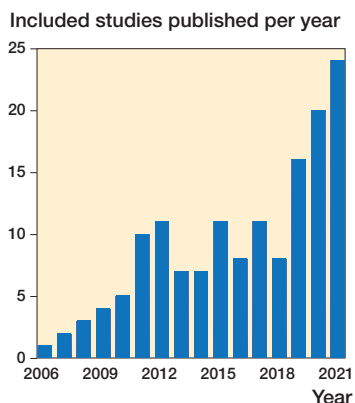


Figure 2. Number of included studies published per year.

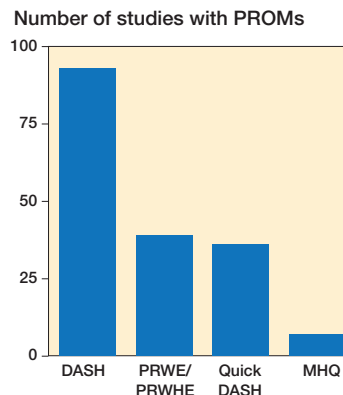


Figure 3. Distribution of patient-reported outcome measures used in the included studies. DASH = Disabilities of the Arm, Shoulder and Hand; QuickDASH = Quick Disabilities of the Arm, Shoulder and Hand; PRWE = Patient-Rated Wrist Evaluation; PRWHE = Patient-Rated Wrist/Hand Evaluation; MHQ = Michigan Hand Outcome Questionnaire.

Section 1. Deviations from the protocol

Formulation in the protocol by Boel et al. (9)	Description of specification or deviation
"Adults (≥ 18 years) having open reduction and internal fixation with volar locking plates after a distal radius fracture" (page 2389).	≥ 75% of the population should be adults ≥ 75% treated with locking volar plates ≥ 75% treated within 3 weeks after trauma
"Included studies have to explore self-perceived functioning at least 3 months after surgery with Patient-Reported Outcome Measures (PROMs) such as the DASH (Disabilities of the Arm, Shoulder and Hand), the QuickDASH, the PRWE (Patient-Rated Wrist Evaluation), the PRWHE (Patient-Rated Wrist/Hand Evaluation), the MHQ (Michigan Hand Outcomes Questionnaire), or the BriefMHQ" (page 2389).	Only the following specifically mentioned PROMs were included: - DASH - QuickDASH - PRWE - PRWHE - MHQ - BriefMHQ
"Systematic reviews that meet the inclusion criteria will be identified for the purpose of reviewing their original source papers for potentially relevant studies" (page 2389).	Reference lists of systematic reviews published from 2017 to 2021 were reviewed for relevant studies included in the systematic review.
"The databases to be searched include MEDLINE (PubMed), CINAHL (EBSCO), Embase (Ovid), Cochrane Library (Cochranelibrary.com), PsycINFO (EBSCO), SPORTSDiscus (EBSCO), and for citation tracking, Web of Science (Clarivate)" (page 2390).	Web of Science searches to identify studies citing the included studies was not employed. This limitation is addressed in the discussion.
"Studies excluded as full-texts for not meeting the inclusion criteria will be recorded and reported" (page 2390).	In total, 436 studies were excluded at the full-text review stage and were therefore not reported.
"Depending on the findings, the evidence may also be presented in tables or graphics for different time points based on the findings of the time points for assessment of the patients' self-perceived functioning in the included studies" (page 2391).	Factors divided into the time intervals of 3–5 months, 6–11 months, 12–23 months, and > 24 months did not add any information to what is shown in Figure 1, and this analysis was thus not reported.
Not specified in the protocol	Additional
Additional data extracted	The following additional data were extracted: - Plate type - Fracture classification
Themes	Due to the large number of factors, the factors were categorized into themes (e.g., associated ligament lesions, pain).

Section 2. Search strategy

MEDLINE search conducted on November 23, 2021

Search	Query	Records retrieved
#1a	"Radius fractures" [MeSH] OR "Wrist Injuries" [MeSH] OR "Radius fracture*" [TW] OR "Colles fracture*" [TW] OR "Wrist fracture*" [TW] OR "Smith* fracture*" [TW] OR "Barton* fracture*" [TW] OR "Radial fracture*" [TW]	17,554
#1b	"Fracture fixation, internal" [MeSH] OR "Bone plates" [MeSH] OR "Open fracture reduction" [MeSH] OR "Osteosynthes*" [TW] OR "Open reduction and internal fixation" [TW] OR "ORIF" [TW] OR "Internal fixation" [TW] OR "Plat*" [TW] OR "Surgical repair*" [TW]	875,702
#2	Function* [TW] OR Disabilit* [TW] OR "Models, Biopsychosocial" [MeSH] OR "Biopsychosocial" [TW] OR "Patient reported outcome measures" [MeSH] OR "Patient-reported outcome*" [TW] OR "Patient-rated outcome*" [TW] OR "Patient-Rated Wrist Evaluation" [TW] OR PRWE [TW] OR "Patient-rated Wrist Hand Evaluation" [TW] OR PRWHE [TW] OR "Disability of the Arm, Shoulder and Hand" [TW] OR DASH [TW] OR QuickDASH [TW] OR "Michigan Hand Outcomes Questionnaire" [TW] OR MHQ [TW] OR "Brief Michigan Hand Outcomes Questionnaire" [TW] OR BriefMHQ [TW] OR "Qualitative Research" [MeSH] OR Interview* [TW] OR "Patient Preference" [MeSH] OR "Patient preference*" [TW] OR "Patient experience*" [TW] OR "Patient perception*" [TW] OR "Daily life" [TW] OR "Activities of daily living" [MeSH] OR "Activities of daily living" [TW] OR Activit* [TW] OR ADL [TW] OR Occupation* [TW] OR Participation [TW] OR "Social activit*" [TW]	7,851,077
#3	#1a AND #1b AND #2	2,290
	Limits: 2005 to present	1,809

Section 3. Operationalization of the data extraction process

Data extraction item	Operationalization
Bibliographic information	Full citation
Study characteristics	
Study ID	Study ID from Covidence
Title	Title of paper that data were extracted from
Study author	First author surname
Year of publication	Year of publication
Country	Country of participants involved <ul style="list-style-type: none"> - If not stated, country of lead author (from contact details) - If more than one country was involved, country of lead author (from contact details)
Study characteristics	
Aim of study	Relevant quotation from paper
Study design	Design selected from the following: <ul style="list-style-type: none"> - Randomized controlled trial - 1 arm used - Randomized controlled trial - 2 arms used - Non-randomized study^a - Prospective cohort^b study - Retrospective cohort^b study - Cross-sectional study - Case-control study - Case series study - Qualitative study - Other
Postoperative rehabilitation	Relevant quotations from paper, including immobilization period, exercises, and referral to hand therapist
Participants	
Sample characteristics <ul style="list-style-type: none"> - Sample size - Age - Sex - Volar plate type - Fracture classification - Factor 	Data from relevant treatment groups were extracted from studies with 2–3 treatment groups <ul style="list-style-type: none"> - Number of participants - Mean age and range and/or SD - Number of males/females - Name of the plate and producer - Name of classification and fracture type - Short description of factors if not self-explanatory
Outcome	
Outcome table <ul style="list-style-type: none"> - Factor - Patient-reported outcome measure (PROM) or patient description - Time point of PROM or patient description 	<ul style="list-style-type: none"> - Name of factor/individual factor from a model^c including a short description if not self-explanatory - Name of PROM^e or patient description - Time point in months^d of measurement of PROM or patient description

^a Non-randomized studies that investigated different interventions (e.g., immobilization, rehabilitation, type of anesthesia) in 2 or more treatment groups without random allocation of patients to the groups

^b Prospective cohort studies that divided the cohort into 2 or more groups based on factors (e.g., sex, age), NOT different interventions

^c Only demographic factors or factors evaluated within 6 weeks post-surgery

^d The time point of the actual follow-up was reported (not the time point of intention to follow up from the methods section)

^e The following PROM abbreviations were used:

- DASH Disabilities of the Arm, Shoulder and Hand
- QDASH Quick Disabilities of the Arm, Shoulder and Hand
- PRWE Patient-Rated Wrist Evaluation
- PRWHE Patient-Rated Wrist/Hand Evaluation
- MHQ Michigan Hand Questionnaire
- BMHQ Brief Michigan Hand Questionnaire

Section 4. Content analysis and mapping of factors to the ICF components

ICF framework and classification

The International Classification of Functioning, Disability and Health (ICF) is the World Health Organization’s framework that encompasses all aspects of human health. The framework conceptualizes a person’s level of functioning as a dynamic interaction between the person’s health condition and the components of “body functions and structures,” “activities and participation,” “environmental factors,” and “personal factors” (3). It is a biopsychosocial model of functioning and is based on an integration of the medical and social models of disability (2).

The ICF classification is organized hierarchically by component (e.g., “activities and participation”), chapter (e.g., “Chapter 4: Mobility”), and category (e.g., “hand and arm use [d445]”) (3).

Mapping procedure

We used the linking rules described by Cieza et al. (22,23) to map the factors. The following steps were employed during the mapping procedure.

Step 1: Factors were extracted from the original research.

Step 2: The content of the factors was identified based on the purpose of the assessments conducted in the original research.

Step 3: Factors were mapped to ICF categories or chapters based on their influence on functioning.

Step 4: The ICF component was identified.

Supplementary criteria

The following supplementary criteria were developed for our review:

- If the factor was explicitly mentioned in an ICF component (e.g., “age” within the component “personal factors”), no further mapping of the factor was performed (Table 4, example 1).
- If the content of the factor was not explicitly mentioned in a component but belonged to a chapter, the factor was mapped in that chapter. For example, though a volar locking plate is not mentioned, it is a technology that is described in “Chapter 1: Products and Technologies” in the “environmental factors” component. Volar plate was then mapped in “e198, products and technology, other specified” (Table 4, example 2).
- A factor was mapped in a category based on the content of that factor. If the category could in turn affect a second category, the factor was only mapped to the first category. For example, the factor “release of pronator quadratus muscle” was mapped to the category “Muscles of forearm (s73012, body structure).” “Muscles of forearm” might in turn affect the category “Power of isolated muscles (b7300, body function),” but as it is a derived effect, the factor was only mapped to the category “Muscles of forearm” (Table 4, example 3).
- A factor could be mapped in more than 1 category. For example, the content of the factor “Pain Anxiety Symptoms Scale” includes pain and how to cope with pain, so the factor was mapped to the categories “Pain in upper limb (b28014, body function)” and “Coping style (personal factor)” (Table 4, example 4).

Table 4. Examples of factor mapping to the ICF framework

Example	Author, year	Factor	Content analysis	ICF category	ICF component
1	Heng et al., 2020 (36)	80–85 years vs > 86 years	Age	-	Personal factors
2	Berger-Groch et al., 2021 (53)	Type of volar locking plate	Technology for fracture stabilization	e198	Environmental factors
3	Tosti and Ilyas, 2013 (154)	Release of m. pronator quadratus: repair vs no repair	Surgery of muscle	s73012	Body structures
4	Roh et al., 2014 (39)	Pain Anxiety Symptoms Scale (PASS)	Pain in upper limb Coping style	b28014	Body functions Personal factors

Table 5. Study characteristics

First author Year Country	Study design	Aim of study	Post-operative rehabilitation	Sample characteristics		DRF classification	Plate type ^c	Factor(s)	Functioning	
				Sample size (Male/Female)	Mean age (range)/(SD)				PROM	Time (mos)
Abd Hamid (45) 2021 Malaysia	RCT 2 TG	Compare WALANT and general anesthesia (GA)	PT + ROM	Gr. 1: WALANT 32 (21/11) Gr. 2: GA 33 (20/13)	Gr. 1: 47 (36-64) Gr. 2: 50 (38-60)	AO: A2-C3	VLP	Anesthesia: WALANT vs GA	QDASH	3 6
Abitbol (46) 2021 France	Non-RCT	Compare functional outcomes between patients operated WALANT and operated under regional anesthesia (RA)	First d: short arm cast and a removable splint for 15 ds PT if necessary	Gr. 1: WALANT 21 (6/15) Gr. 2: RA 20 (10/10)	Gr. 1: 67 Gr. 2: 63	NA	VLP	Anesthesia: WALANT vs RA	QDASH	3 6
Ali Fazal (47) 2020 UK	Retro	Evaluate the role of VLP in independent older individuals compared to younger individuals	0-2 wks: below elbow slab 2 wks: removable splint + ROM + PT	Gr. 1: Age <55 58 (20/34) Gr. 2: >55 47 (7/40)	Gr. 1: 40 (17-54) Gr. 2: 59 (55-80)	NA	VLP	Age: <55 vs >55	QDASH	18
Andrade-Silva (48) 2019 Brazil	RCT 2 TG	Compare the pain scores, rates and doses of opioid use and functional scores in patients using or not using postoperative immobilization	No splint First d: light wrist ROM + PT + precautions against impact ADL Splint 2 wks: splint	Gr. 1: No splint 19 (8/11) Gr. 2: Splint 20 (9/11)	Gr. 1: 51 (17) 67 Gr. 2: 48 (15)	AO/OTA: Gr. 1 C1-C3 Gr. 2 B3-C3	VLP	Immobilization: no splint (soft wrist dressing) vs splint for 2 wk	DASH	3 6
Arora (49) 2007 Austria	Prosp	Analyze whether a fixed-angle plate is sufficient to treat unstable dorsally displaced #	0-10 ds: below elbow splint 10-17 ds: removable splint + active/passive wrist ROM + PT	114 (21/93)	57 (17-79)	AO/ASIF: A2-C3	2.4 mm LCP DRP: Synthes, Salzburg, Austria.	AO/ASIF # type: A2-C3	DASH	15
Ashdown (50) 2021 UK	Retro	Investigate the effect of timing of surgery on patient outcomes for displaced and intra-articular fractures	0 up to 4 wks: splint 2 wks: HT unless the splint was no longer required	158 (66/92)	Men: 55 (26-74) Women: 59 (29-86)	AO: A2-C3	AcuLok-2 DRLP: Acumed, Hillsboro, USA or Variax DRLP: Stryker, Freiburg, Germany	Age Gender Implant type Period of splinting Seniority of surgeon Time to surgery >2 wks # type	PRWHE	36
Bae (51) 2017 South Korea	Case control	Evaluate clinical and radiological outcomes in partially healed # (delay surgery of 2-6 wks) compared to acute treated #	0-2/4 wks: short arm splint	Gr. 1: Surgical delay >2 wks 24 (4/20) Gr. 2: Surgery ≤2 wks 48 (8/40)	Gr. 1: 55 (55-62) Gr. 2: 56 (53-60)	OTA: A3, C2	2.4 mm VLCP: Synthes GmbH, Oberdorf, Switzerland or Medartis Aptus Volar Plate: Medartis, Basel, Switzerland	Surgery: delay vs acute	DASH	3 12
Berger-Groch (53) 2021 Germany	RCT 2 TG	Evaluate differences between the standard titanium plates and plates made of polyether ether ketone (CFR-PEEK)	0-2 wks: below-elbow splint 2-6 wks: wrist brace 2 wks: PT	Gr. 1: CFR-PEEK plates 16 (6/10) Gr. 2: Standard plates 15 (4/11)	59 (24-86/14)	AO: Gr. 1 A2, B3-C2 Gr. 2 A2-A3, B2-C2	Gr. 1: CFR-PEEK Power, DRP, Arthrex, Florida, USA Gr. 2: VariAx DRP: Stryker, Michigan, USA	Plates: CFR-PEEK vs standard titanium	DASH	6 36
Boel (32) 2022 ^a Denmark	Prosp	Investigate to what extent self-reported measures of disability, pain, and performance of ADL can predict disability	0-2 wks: below elbow cast 2-5 wks: removable orthosis 2 wks: wrist ROM + ADL OT if necessary	Gr. 1: Disability at 6 mos 42 (4/38) Gr. 2: No disability at 6 mos 59 (15/44)	Median Gr. 1: 68 (38/86) Gr. 2: 65 (20-85)	NA	VLP	Age Sex Hand fractured: dominant vs non-dominant Educational level Pre-# disability (QuickDASH) Disability (DASH) Pain (VAS) during ADL Pain (VAS) worst past week Performance of ADL (COPM) Satisfaction with performance of ADL (COPM)	DASH	6
Bot (15) 2012 USA	Retro	Evaluate whether there is no association between loss of range of motion, specific tasks, and psychological factors	NA	63 (18/45)	52 (23-81/14)	AO: A-C	VLP	Age Days to surgery Center for Epidemiologic Studies Depression Scale Pain Catastrophizing Scale Pain Anxiety Symptoms Scale (PASS) OT vs home exercises Sex Dominant wrist injured AO # type	DASH	3
Braziulis (53) 2013 Lithuania	Prosp	Investigate associations between # type, age, sex, and hand function	0-2 wks: wrist immobilization First d: forearm ROM	120 (14/106)	Gr. 1: # type A 62 (13) Gr. 2: # type B 65 (12) Gr. 3: # type C 63 (12)	AO: A-C	Self-locking volar plates and screws: Changzhou Kanghui Medical Innovation Co., Ltd	Age Sex # type	DASH	6
Brehmer (54) 2014 USA	RCT 2 TG	Compare clinical outcomes between traditional and accelerated rehabilitation protocols	3/5 ds: active wrist ROM Standard rehabilitation 0-6 wks: removable splint 6 wks: passive ROM + strengthening Accelerated rehabilitation 0-4 wks: removable splint 2 wks: passive ROM + strengthening	Gr. 1: Standard rehabilitation 42 (12/30) Gr. 2: Accelerated rehabilitation 36 (9/27)	Gr. 1: 55 (27-83) Gr. 2: 50 (21-72)	AO: A2-C3	Hand Innovatins DVRP, Biomet, Warsaw, Indiana	Rehabilitation: standard vs accelerated	DASH	3 6
Buyukurt (55) 2012 Turkey	Prosp	Evaluate the effect of osteoporosis on functional outcomes	0-3 wks: short arm splint 3 wks: wrist ROM + followed on an outpatient basis	Gr. 1: Osteoporosis 20 (0/20) Gr. 2: No osteoporosis 17 (0/17)	Gr. 1: 57 (45-65) Gr. 2: 37 (27-51)	AO: A3-C1	VLP	Osteoporosis vs no osteoporosis	DASH	12

Campochiaro (56) 2013 Italy	Prosp	To compare two different treatments methods to assess costs and benefits	0-15/20 ds: wrist support 15 ds: functional rehabilitation	38 (8/30)	62 (28-81)	AO: B1-C2	Angular stability volar plate: Aptus Mikai	AO type: B vs C	DASH	24
Cha (57) 2012 Korea	Non-RCT	Compare the outcomes of 2 treatments methods for unstable distal ulna # in patients 65 years of age and older	<i>Operatively treated styloid #</i> 0-2 wks: short arm splint 2-3 wks: removable splint 2 wks: PT <i>Non-operatively treated styloid #</i> 0-4 wks: long arm splint If the alignment of the styloid # was further displaced, additional annual reduction was performed 4 wks: PT + active ROM <i>Both groups</i> 10/12 wks: resistance exercises	Gr. 1: Operatively treated styloid # 29 (16/13) Gr. 2: Non-operatively treated styloid # 32 (18/14)	Gr. 1: 67 (65-73) Gr. 2: 68 (65-76)	AO: A2-A3, C1-C3	Anatomical volar DR plate: Stryker Leibinger, Freiburg, Germany or volar angle-stable plate: Aptus Radius, Medartis, Basel, Switzerland	Associated ulnar # treatment: operatively vs non-operatively	DASH	34
Cha (58) 2021 Korea	Retro	Investigate the effectiveness of temporary percutaneous reduction/pinning of partial scapholunate ligament (SL) injuries	<i>K-wire fixation of SL</i> 0-2 wks: short arm splint 2-4 wks: removable splint 4 wks: PT <i>Non-operative treatment of SL</i> 0-4 wks: long arm splint	Gr. 1: K-wire fixation of SL 43 (5/38) Gr. 2: Non-operative treatment of SL 36 (5/31)	Gr. 1: 53 (7) Gr. 2: 54 (7)	AO: A2-A3, B2-C3	DVR anatomic plate: Biomet, Warsaw, IN, USA or volar angle-stable plate Aptus Radius: Medartis, Basel	Associated scapholunate injury: K-wire fixation vs non-operative treatment	DASH	Gr. 1: 85 Gr. 2: 88
Cha (59) 2021 Korea	Case control	Seek predictors of non-surgical treated basal ulnar styloid # union	0-3 wks: long-arm splint 3 wks: removable splint 6 wks: PT	Gr. 1: Ulnar styloid # union 58 (15/43) Gr. 2: Ulnar styloid # non-union 147 (55/92)	Gr. 1: 59 (7) Gr. 2: 61 (10)	AO/OTA: A2-A3, B1, B3-C3	Anatomical AO locking plate: Depuy Synthes, West Chester, PA, USA, or volar angle-stable plate: Aptus Radius, Medartis, Basel, Switzerland, or DVRP: Biomet, Warsaw, IN, USA	Bone mineral density (BMD)	DASH	Gr. 1: 30 Gr. 2: 29
Chen (60) 2019 China	Retro	Compare outcomes of two different plates: Variable-angle volar rim locking compression plates (VA-LCP) and fixed-angle volar rim locking compression plates (FA-LCP)	<i>VA-LCP</i> 0-1 wk: wrist brace 1 wk: gradual rehabilitation <i>FA-LCP</i> 0-6 wks: plaster splint 6 wks: rehabilitation	Gr. 1: VA-LCP 19 (4/15) Gr. 2: FA-LCP 28 (6/22)	Gr. 1: 53 (42-65) Gr. 2: 54 (39-66)	NA	Gr. 1: 2.4 mm VA-LCP Gr. 2: FA-LCP	Plate type: VA-LCP vs FA-LCP	DASH	3 6 Gr. 1: 15 Gr. 2: 16
Choi (26) 2015 Korea	Retro	Investigate the influence of osteoporosis on outcomes in post-menopausal women, and analyze correlations between outcomes and mineral bone density (BMD)	0-1 wk: splint 1-4 wks: removable brace for 4 wks. 2 wks: wrist ROM	Gr. 1: Osteoporosis 51 (0/51) Gr. 2: No osteoporosis 39 (0/39)	Gr. 1: 67 (7) Gr. 2: 61 (9)	AO: A-C	VLP: Synthes, Paoli, Pennsylvania or Acumed, Hillsboro, Oregon	Osteoporosis (T-score \leq -2.5): yes vs no Age Days to surgery Dominant extremity injured Fracture type (AO) T-score <-2.5 Ulnar styloid # Initial volar tilt Initial ulnar variance	DASH	Gr. 1: 26 Gr. 2: 25
Chung (25) 2007 USA	Prosp	Identify demographic factors, injury patterns, and socioeconomic factors associated with outcomes	0-6 wks: removable splint 1 wk: ADL within splint 1-6 wks: HT + active wrist ROM	79	49 (17)	AO: A-C	DVRP system: Stryker Orthopaedics, Mahwah, New Jersey	Age Education Whether dominant hand was fractured Workers' compensation (yes/no) # type (AO classification) Sex Income Associated ulnar styloid #	MHQ	3 12
Chung (61) 2008 USA	Prosp	Assess radiographic changes, functional recovery, and patient-based outcomes and evaluate the rate of complications and recovery in older and young patients	0-6 wks: plaster wrist splint followed by a removable costume made splint 0-1 wk: HT + active wrist ROM + ADL within the splint 6 wks: strengthening exercises	Gr. 1: Age >60 25 (6/19) Gr. 2: Age 20-40 30 (16/14)	Gr. 1: 69 (60-83) Gr. 2: 30 (20-40)	AO: A-C	DVRP system: Hand Innovations, Miami, FL	Age: >60 years vs 20-40 years Gender Income AO # type	MHQ MHQ	3 6 12 12
Clementsen (62) 2019 Norway	RCT 2 TG	Compare early mobilization and PT with late mobilization and home exercises	<i>Early mobilization group</i> 0-2/3 ds: plaster of Paris 2/3 ds PT + active ROM 2 wks: passive stretching + load bearing 6 wks: unrestricted load bearing <i>Late mobilization group</i> 0-2 wks: plaster of paris 2 wks: home ROM 6 wks: unrestricted load bearing	Gr. 1: Early mobilization 57 (4/53) Gr. 2: Late mobilization 62 (7/55)	Gr. 1: 55 (12) Gr. 2: 55 (12)	AO/OTA: A	DVRP: DePuy	Early mobilization and PT vs late mobilization and home exercises	QDASH PRWE	3 12 24
Costa (63) 2015 UK	RCT 1 TG	Quantify observed differences in the PRWE and DASH questionnaire score. Determine complication rates, the resource use and cost-effectiveness of K-wire fixation vs locking plate fixation	First day or at cast removal: ROM Written information and any other rehabilitation were left to the discretion of the surgeon	231 (37/194)	58 (15)	A2-B2, C1-C3	VLP	Age: <50 vs \geq 50 Intra-articular extension (yes/no)	PRWE	12

Dennison (64) 2020 USA	RCT 2 TG	Compare outcomes in patients treated with an early vs late motion protocol	<i>Early wrist ROM</i> 0-14 ds: wrist splint or short arm cast 14 ds: active/passive wrist ROM + gradual strengthening + HT <i>Late wrist ROM</i> 0-5 wks: wrist splint or short arm cast 5 wks: active/passive wrist ROM + gradual strengthening + HT	Gr. 1: Early wrist ROM 18 (1/17) Gr. 2: Late wrist ROM 15 (1/14)	Gr. 1: 55 (18) Gr. 2: 53 (15)	NA	VLP	Wrist ROM: Early (14 ds) vs late (5 wks)	DASH PRWE	3 6 12
Dukan (65) 2020 France	Non-RCT	Compare WALANT vs conventional loco-regional anesthesia (LRA)	<i>WALANT</i> First d: wrist ROM + removable splint if pain <i>LRA</i> 0-2wks: splint 2 wks: wrist ROM	Gr. 1: WALANT 15 (11/4) Gr. 2: LRA 30 (19/11)	Gr. 1: 53 (4) Gr. 2: 55 (7)	NA	VLP: NewClip, Haute-Goulaine, France	Anesthesia: WALANT vs LRA	QDASH	3 6
Duprat (66) 2018 France	Retro	Demonstrate that a split after osteosynthesis is unnecessary	<i>Late mobilization</i> 0-2 wks: splint 2 wks: self-rehabilitation <i>Early mobilization</i> First d: ROM	Gr. 1: Late mobilization 36 (7/29) Gr. 2: Early mobilization 36 (11/25)	Gr. 1: 58 (21-87) Gr. 2: 61 (21-92)	AO: Gr. 1 A2-A3, B3-C3 Gr. 2 A2-A3, C1-C2	VLP: Initial R, Newclip Technics, Haute Goulaine, France	Mobilization: splint for 2 wks followed by self-rehabilitation vs early mobilization	QDASH PRWE	3
Egol (67) 2012 USA	Retro	Examine clinical and functional results in patients treated with 2 different types of anesthesia (general anesthesia (GA) or regional anesthesia (RA))	0-1 wk: plaster splint 1 wk: removable splint + PT/OT + wrist/forearm ROM	Gr. 1: GA 122 (55/67) Gr. 2: RA 65 (18/47)	Gr. 1: 54 (16) Gr. 2: 55 (16)	OTA: A-C	VLP: Hand Innovations, Miami, FL or Stryker, Mahwah, NJ	Anesthesia: GA vs RA	DASH	3 6 12
Elerian (68) 2021 Great Britain	Retro	Examine outcomes in patients treated with the Aptus locking plate	The use of casts, splints, and HT varied considerably	61 (20/41)	56 (22-89)	AO: A-C	Aptus: Medartis, Pennsylvania	AO # classification Days to surgery Grade of surgeon	DASH	12
Erhart (69) 2018 Austria	Retro	Evaluate correlations between the direction of displacement and the outcomes between Colles and Smith #	0-3 wks: below elbow cast	Gr. 1: Smith 25 (7/18) Gr. 2: Colles 25 (7/18)	Gr. 1: 56 (6) Gr. 2: 55 (11)	NA	VLP	Fracture type: Smith vs Colles	DASH PRWE	64
Ezzat (70) 2016 UK	Prosp	Investigate outcomes of patients ≤ 59 and ≥ 60 years	0-10/14 ds: bulky bandage/plaster of Paris 10/14 ds: wrist ROM + PT	Gr. 1: ≤ 59 43 (11/32) Gr. 2: ≥ 60 35 (5/30)	Gr. 1: 46 (17-59) Gr. 2: 70 (60-83)	AO/OTA: A-C	VLP	Age: ≤ 59 years vs ≥ 60 years	PRWE QDASH	6
Fan (71) 2014 China	Non-RCT	Compare patients who underwent PQ incision and repair with patients who had a PQ sparing approach	<i>Repair of PQ</i> 0-2 wks: plaster splint <i>PQ sparing</i> ROM <i>Both groups</i> 6 wks: ADL	Gr. 1: PQ repair 35 (23/12) Gr. 2: PQ sparing 30 (19/11)	Gr. 1: 44 Gr. 2: 41	AO/OTA: A-C	VLP: DePuy or Smith Company	PQ: repair vs sparing	DASH	3 16
Fan (72) 2017 China	Retro	Identify the potential effect of pre-operative closed reduction	0-2 wks: splint 2 wks: PT + ROM 6 wks: max. ROM	Gr. 1: Preoperative closed reduction 70 (46/24) Gr. 2: Without preoperative closed reduction 58 (38/20)	Gr. 1: 46 Gr. 2: 43	AO/OTA: A-C	VLP: Deputy company	Preoperative plaster immobilization: closed reduction vs no closed reduction	DASH	3 15
Fang (40) 2021 Hong Kong	Prosp	Evaluate the relationship patient pre-treatment expectations and post-treatment clinical outcomes, and fulfillment of expectations and patient satisfaction	NA	133 (44/89)	55 (14)	AO: A2-A3, B3-C3	A-VLP	Trauma Expectation Factor (TEF) (part 1 of TEFTOM) Age Sex Injured side Injury mechanism Injury on duty # type Tscherne grade (soft tissue injury) Plate type	QDASH	6 12
Fitzpatrick (17) 2012 USA	Retro	Explore the influence of osteoporosis on outcomes in postmenopausal females	0-1 wk: plaster orthosis 1 wk: custom-made thermoplastic orthosis + OT	Gr. 1: Osteopenia 44 (0/44) Gr. 2: Osteoporosis 20 (0/20)	Gr. 1: 62 (8) Gr. 2: 67 (10)	AO: A2-B1, C1-C3	Volar plate with locking screw	Osteopenia (T-score of -1 to -2.5) vs osteoporosis (T-score < -2.5) Normal bone mineral density vs osteopenia Normal bone mineral density vs osteoporosis Age Charlson Comorbidity Index (CCI) Prior fragility # Days to surgery	DASH DASH	3 22 22
Galmiche (73) 2019 France	Retro	Compare the results of minimally invasive plate osteosynthesis (MIPO) in postmenopausal patients: longitudinal vs transverse	NA	Gr. 1: Longitudinal incision 15 (0/15) Gr. 2: Transverse incision 15 (0/15)	74 (66-90)	NA	Initial R: Newclip Technics, Haute-Goulaine, France	MIPO: longitudinal incision vs transverse incision	PRWE QDASH	>6
Galos (74) 2016 USA	RCT 2 TG	Compare pain and functional scores in patients receiving ether general anesthesia (GA) or brachial plexus blockade (BPB)	NA	Gr. 1: GA 18 (6/12) Gr. 2: BPB 18 (9/9)	Gr. 1: 55 (17) Gr. 2: 54 (15)	OTA: A-C	VLP	Anesthesia: GA vs BPB	DASH	3

Gamo (75) 2021 Japan	RCT 2 TG	Evaluate the efficacy of HT in middle-aged to elderly females	First d: active wrist ROM 2 wks: passive ROM 4 wks: proprioceptive neuromuscular facilitation 5 wks: strengthening	Gr. 1: HT 29 Gr. 2: Independent exercises 28	Gr. 1: 69 (9) Gr. 2: 67 (11)	OA/OTA: Gr. 1 A2-A3, B3-C3 Gr. 2 A2-A3, C1-C3	Acu-Loc2 VDR Plates: Acumed or Acu-Loc2 VDR Proximal Plates: Acumed	HT vs independent exercises	PRWE QDASH	3 6
Gogna (76) 2014 India	Prosp	Evaluate the effect of associated ulnar styloid #	<i>Grade II shuck</i> 0-6 wks: plaster of paris <i>Rest of the cases</i> 0-2 wks: plaster of paris <i>Both groups</i> After slab removal: PT + active wrist ROM	Gr. 1: Ulnar styloid # 28 (12/16) Gr. 2: No ulnar styloid # 19 (7/12)	Gr. 1: 34 Gr. 2: 33	AO: Gr. 1 A3, B3-C3 Gr. 2 A3, B2-B3, C2-C3	Fixed angle VLP: Synthes, Switzerland,	Associated ulnar styloid #: yes vs no	DASH	Gr. 1: 35 Gr. 2: 36
Gong (77) 2012 South Korea	RCT 2 TG	Determine whether the early use of bisphosphonate affects healing and outcomes of osteoporotic #	0-1 wk: short-arm plaster splint 1 wk: removable wrist brace used within comfortable ranges 2 wks: PT/OT	Gr. 1: Bisphosphonate 24 (0/24) Gr. 2: No bisphosphonate 26 (0/26)	Gr. 1: 67 (53-79/8) Gr. 2: 66 (52-82/9)	AO: A2-C3	VLP: Acumed, Hillsboro, Oregon	Bisphosphonate medications start at 2 wks: yes vs no	DASH	6
Goorens (78) 2021 Belgium	RCT 2 TG	Investigate the influence of PQ repair	0-2 wks: short-arm splint 2 wks: home exercises 6 wks: PT + wrist ROM + strengthening	Gr. 1: PQ repair 35 (13/22) Gr. 2: No PQ repair 30 (7/23)	Gr. 1: 60 (19-93/22) Gr. 2: 64 (23-93/21)	AO: A2-C3	VA- LCP 2- column DRP 2.4: Depuy Synthes, Oberdorf Switzerland	PQ release: repair vs no repair	QDASH	3 6 12
Goorens (79) 2021 Belgium	Non- RCT	Compare outcomes of the PQ sparing minimally invasive plate osteosynthesis (MIPO) technique to the conventional extended flexor carpi radialis (FCR) approach with PQ repair	0-1 wk: short-arm splint 6 wks: PT + ROM + strengthening	Gr. 1: MIPO with PQ sparing 62 (16/46) Gr. 2: FCR approach with PQ 67 (20/47)	Gr. 1: 61 (18-93/20) Gr. 2: 61 (20-92/21)	AO: A2-A3, C1-C2	VA-LCP 2- column DRP 2.4: DePuy Synthes, Oberdorf, Switzerland or FPL-adapted plate: Medartis, Basel, Switzerland	MIPO with PQ sparing vs extended FCR approach with PQ repair	QDASH	3 6 12
Gruber (80) 2006 Austria	Prosp	Evaluate the results focusing on patients' quality of life	<i>Type C #</i> 0-4 wks: cast 4 wks: PT <i>Type A and B #</i> After wound healing: PT	93 (24/69)	60 (17-91)	AO: A2-A3, B3-C3	Angle fixed bar palmar plating system: I.T.S., Lassnitzhöhe, Austria	Gender	DASH	16
Gruber (81) 2010 Austria	Prosp	Correlate outcomes with the QoL of patients, compare QoL data between patients and USA and Austrian population norms, and evaluate whether functional outcomes continue to improve	0-4 wks: splint. First d: forearm ROM 4 wks: HT and ROM 6 wks: strengthening exercises	54 (17/37)	63 (24-93/18)	AO: C1-C3	VLP system: I.T.S. Implantat- Technologie- Systeme Lassnitzhoehe, Austria	Age: <60 years vs ≥60 years	DASH	24 72
								Sex Osteoporosis (yes/no)	DASH	72
Gui (82) 2021 China	Prosp	Assess the efficacy of a modified intra-focal pinning technique with 3D planning to facilitate volar plating in dorsally comminuted intra-articular #	NA	35 (12/23)	62 (29-83)	AO/OTA: C2-C3	2.4-mm VLP: Depuy-Synthes, Oberdorf, Switzerland	# type AO/OTA: C2 vs C3	DASH	17
Haberle (83) 2015 Germany	RCT 2 TG	Determine the influence of PQ repair	0/2-4 wks: cast First d: passive ROM + PT 4 wks: PT + active ROM 4-6 wks: restricted weight bearing	Gr. 1: PQ repair 31 (7/24) Gr. 2: No PQ repair 29 (5/24)	Gr. 1: 52 (22-77) Gr. 2: 56 (25-76)	AO: A2-A3	2.5 mm multidirectional fixed-angle plate: Distal Radius 2.5, Medartis, Basel, Switzerland or 2.4 mm unidirectional locking plate: Synthes, Umkirch, Germany	PQ repair: yes vs no	QDASH	3
Hall (84) 2019 USA	Retro	Understand the impact of obesity and smoking on outcomes	NA	200 (40/160)	57 (14)	AO: A-C	Stryker Variax plate: Stryker, Kalamazoo, MI or Biomet DVR: Zimmer/ Biomet, Warsaw, IN or Wright Medical Locon VLS plate: Wright Medical, Memphis, TN	Obesity (BMI≥30): yes vs no Smoking history: current vs former vs never	QDASH	3 13
Heng (36) 2020 Singapore	Retro	Describe the epidemiology of DRF and, study functional outcome and time to # union	0/1 wk: thermoplastic splint + HT 6 wks: weight bearing + ADL	76 (6/70)	85 (80-97/4)	AO: A-C	VLP	Ambulatory status: independent vs walking aid (stick/frame) Age: 80-85 vs > 86 years Osteoporosis (BMD): yes vs no	DASH	3 6
Henry (85) 2020 USA	Retro	Compare outcomes of type I open DRF treated with delayed surgery with those treated with urgent surgery	NA	Gr. 1: Delayed surgery: 7 Gr. 2: Immediate surgery: 17 Both groups: (6/18)	Gr. 1: 63 (47-53) Gr. 2: 63 (20-89)	AO: A-C	A-VLP	Surgery: delayed (2-15 days) vs immediate (within 24 hours)	QDASH	13
Hershman (86) 2013 USA	Retro	Compare patients who underwent PQ incision and repair with patients who underwent incision without repair	0-1/2 wks: short-arm plaster splint 1/2 wks: ROM + OT 6 wks: weight bearing	Gr. 1: PQ repair 62 (29/33) Gr. 2: No PQ repair 50 (21/29)	Gr. 1: 54 (50-58) Gr. 2: 52 (47-56)	OA/OTA: A-C	Stryker – Mahwah, NJ, or DePuy Orthopedics – Warsaw, IN	PQ repair: yes vs no	DASH	12

Hodel (18) 2020 Switzerland	Retro	Assess outcomes and potential risk factors for adverse functional outcomes	Early ROM and PT	87 (29/58)	57 (18-92)	AO/OTA: C2-C3	LCPDR Synthes, Oberdorf, Switzerland	Polytrauma (ISS) > 16 Temporary joint spanning external fixation: yes vs no Age Gustilo classification (open fractures) Trauma energy: high vs low	PRWE	31
Hohendorf (87) 2018 Germany	RCT 2 TG	Analyze the clinical outcome of PQ repair with a part of the brachioradialis muscle compared to no repair of PQ	0-2 wks: forearm splint 2-6 wks: wrist ROM without load	Gr. 1: PQ repair 20 (4/16) Gr. 2: No PQ repair 16 (6/10)	Median age Gr. 1: 64 (18-77) Gr. 2: 54 (18-80)	OA: Gr. 1 A2-A3, C1 Gr. 2 A2-A3, B3-C1	Stryker VariAx VLP	PQ repair: no vs yes with a part of the brachioradialis	DASH	15
Hosokawa (88) 2020 Japan	Prosp	Compare operative and non-operative treatments, and explore the relationship between hand dominance and # side	0-1 wk: forearm 1 wk: active ROM + OT	Gr. 1: # of dominant hand 26 (8/18) Gr. 2: # of non-dominant hand 28 (1/27)	Gr. 1: 73 (5) Gr. 2: 73 (6)	AO/OTA: Gr. 1 A2-A3, B2-C3 Gr. 2 A2-A3, B3-C3	VLP	# of hand: dominant vs nondominant	QDASH	3 26
Hull (89) 2011 UK	Retro	Compare the results of K-wire fixation vs VLP fixation	Dressing or wrist splint followed by early mobilization + HT	36 (9/27)	58 (18-86)	NA	VLP	# type: Extra-articular vs intra-articular	DASH PRWE	15-27
Iitsuka (90) 2016 Japan	Retro	Specification of the outcomes that affect the achievement of a DASH MCID	<i>Early rehabilitation</i> 0/3 d: active ROM <i>Late rehabilitation</i> 2 wks: active ROM <i>Both groups</i> 6 wks: passive ROM 8 wks: strengthening	Gr. 1: Early rehabilitation 27 (7/27) Gr. 2: Late rehabilitation 18 (8/10)	Gr. 1: 57 (33-78/13) Gr. 2: 49 (19-81/19)	AO: Gr. 1 A2-A3, B2-C3 Gr. 2 A2-A3, B2, C1-C3	VLP	Rehabilitation: early (within 3 days) vs late (2 weeks)	DASH	3
Itoh (91) 2016 Japan	Non-RCT	Evaluate the effect of PQ preservation in severely comminuted intra-articular #	First d: OT + active ROM 1/2 wks: active assisted ROM <i>Ulnar styloid base #</i> 0-2/3 wks: splint	Gr. 1: PQ repair 30 (4/26) Gr. 2: PQ sparing 35 (7/28)	Gr. 1: 71 (9) Gr. 2: 71 (9)	AO/OTA: C2-C3	Polyaxial VLP: the Aptus 2.5: Medical Engineering System Co. Tokyo, Japan	PQ: repair vs sparing approach	QDASH	3 4 6 12
Javed (92) 2015 UK	Retro	Review of the one-year outcome	0-2 wks: bandage 2 wks: PT + ROM 6 wks: strengthening exercises	Gr. 1: Low risk # 44 Gr. 2: High risk # 18 Both groups: (22/40)	53 (17-86)	Fernandez: Gr. 1 1-2 Gr. 2 3-5	VariAx: Stryker or LCP: Synthes or Peri-Loc: Smith & Nephew	Fernandez classification: Low risk # vs high risk #	PRWE	12
Jung (93) 2021 Korea	Retro	Identify whether it is necessary to achieve alignment by preoperative closed reduction and, ascertain if it is important for satisfactory outcomes	0-4 wks: removable splint	Gr. 1: Non-acceptable reduction 66 (13/53) Gr. 2: Acceptable reduction 135 (24/111)	Gr. 1: 63 (13) Gr. 2: 61 (13)	AO/OTA: A2-A3, B3-C2	VA-LCP: Depuy Synthes, Paoli, PA, USA or DVRP: Biomet, Miami, Florida, USA	Reduction prior to surgery: acceptable vs non-acceptable	DASH	12
Kaneshiro (94) 2019 Japan	Case control	Compare intraoperative CT navigation system for VLP fixation with conventional freehand fluoroscopy guided surgery	NA	Gr. 1: CT navigated surgery 12 (5/7) Gr. 2: Fluoroscopy guided surgery 16 (4/12)	Gr. 1: 56 (32-78) Gr. 2: 60 (25-79)	AO: C3	Polyaxial VLP; APTUS Distal Radius 2.5: Medartis, Basel, Switzerland	CT navigated surgery vs fluoroscopy guided surgery	DASH	12
Khamaisy (95) 2011 Israel	Case control	Compare the results of dorsally comminuted and dorsally intact # fixed with a single VLP without bone graft	Dressing and active wrist ROM	Gr. 1: Dorsally intact # 50 (18/32 ^b) Gr. 2: Dorsally comminuted # 41 (24/17 ^b)	Gr. 1: 45 (17) Gr. 2: 59 (17)	AO/OTA: Gr. 1 A3-C3 Gr. 2 A3-B1, C1-C3	2.4/3.5-mm VLP DVRP: Hand Innovation, DePuy International, Leeds, UK	Dorsally #: comminuted vs intact	DASH	12
Khan (96) 2020 Pakistan	RCT 1 TG	Compare patients with dorsally displaced # treated with K-wire fixation vs treated with VLP fixation	NA	50 (33/17)	46 (9)	NA	VLP	Anatomical side of fracture Age: 20-40 vs 41-60 Sex	DASH	3
Kim (97) 2010 South Korea	Prosp	Determine whether an accompanying ulnar styloid # has any effect on wrist function or distal radioulnar joint stability	<i>Intraoperative laxity of distal radioulnar joint</i> 0-4 wks: sugar tong splint <i>Unstable distal radioulnar joint</i> 0-4 wks: short arm splint 4-6 wks: removable short arm brace + ROM	138 (53/85)	49 (17-88)	NA	2.4-mm VLCP: Synthes, Paoli, Pennsylvania	Processus styloideus #: none vs nonbase vs base Processus styloideus #: none vs minimally displaced (<=2 mm) vs considerably displaced (>2mm)	DASH	19
Kim (98) 2011 South Korea	RCT 2 TG	Evaluate whether augmentation of VLP fixation with calcium phosphate bone cement has any benefit over VLP alone in patients >65 years	0-2 wks: short arm splint 2 wks: removable short arm brace + active wrist ROM	Gr. 1: VLP 24 (3/21) Gr. 2: VLP plus calcium phosphate bone cement 24 (5/19)	Gr. 1: 74 Gr. 2: 72	NA	3.5-mm or 2.4-mm VLCP: Synthes, Paoli, Pennsylvania	VLP: alone vs plus calcium phosphate bone cement	DASH	3 12
Kim (99) 2013 Korea	Prosp	Investigate whether low-grade open # have worse DASH scores and higher infection rates than closed #	NA	Gr. 1: Open # 20 (8/12) Gr. 2: Closed # 40 (16/24)	Gr. 1: 54 Gr. 2: 52	OTA: A3, C1-C3	VLP	Low grade open # vs closed #	DASH	3 12
Kim (100) 2013 South Korea	Prosp	Examine the association between TFCC injury and intraoperative DRUJ laxity and determine whether the latter is associated with adverse outcomes	<i>Unstable DRUJ</i> 0-4 wks: sugar tong splint <i>Stable DRUJ</i> 0-4 wks: short arm splint 4-6 wks: short arm brace 4 wks: wrist ROM	Gr. 1: DRUJ instability 19 (9/10) Gr. 2: DRUJ stability 65 (26/39)	Gr. 1: 44 (19-60) Gr. 2: 45 (18-60)	OTA/OA: A, C	2.4-mm VLCP: Synthes, Paoli, PA	DRUJ: instable vs stable	DASH	12

Kim (101) 2014 South Korea	Prosp	Determine the effect of release of the brachioradialis	NA	Gr. 1: Brachioradialis released 22 (4/18) Gr. 2: Brachioradialis preserved 20 (3/17)	Gr. 1: 59 Gr. 2: 57	AO/OTA: A-C	VA-LCP 2-column DRP: Synthes GmbH, Switzerland or Medartis Aptus Volar Plate: Medartis, Switzerland	Brachioradialis: released vs preserved	DASH	3
Konstantinidis (102) 2010 Germany	Retro	Evaluate outcomes and complications with a special focus on the degree of post-operative loss of reduction of AO/OTA C-type #	D 2: PT + passive/active wrist ROM	40 (17/23)	54 (19-86)	AO/OTA: C1-C3	2.4 LCP: Synthes, Oberdorf, Switzerland	AO/OTA # type	DASH	17
Koo (103) 2021 Hong Kong	Prosp	Compare outcomes between arthroscopic assisted # reduction and fluoroscopic # reduction in treating highly unstable intra-articular AO type C #	First d: wrist/forearm ROM <i>Intra-articular soft tissue injury</i> 8 wks: passive ROM + strengthening exercises <i>Without intra-articular soft tissue injury</i> 6 wks: passive ROM + strengthening exercises	Gr. 1: Arthroscopic assisted reduction 12 Gr. 2: Fluoroscopic reduction 12 Both groups: (15/9)	Both groups: 57 (27-73)	AO: C1-C3	2.4-mm VA-LCP: DePuy-Synthes, West Chester, PA or Aptus Wrist Distal Radius System 2.5 mm: Medartis, Kennett square, PA	# reduction: Arthroscopic-assisted vs fluoroscopic reduction	QDASH	13
Kopec (104) 2018 Poland	Retro	Evaluate the efficacy of surgical treatment of Smith flexion # vs Colles extension #	0-2 wks: immobilization 2 wks: rehabilitation	Gr. 1: Smith 25 (17/18) Gr. 2: Colles 25 (6/19)	Both groups: 43 (18-67)	AO: B-C	Angle-stable plate	Fracture type: Smith vs Colles	QDASH	24-36
Kurozumi (105) 2021 Japan	Retro	Determine whether simultaneous fixation of both distal radius and distal metaphyseal ulnar # would improve outcomes	NA	Gr. 1: Surgical treatment of ulnar # 14 (0/14) Gr. 2: Conservatively treatment of ulnar # 9 (0/9)	Gr. 1: 72 (8) Gr. 2: 72 (15)	AO/OTA: Gr. 1 A2-A3, C2-C3 Gr. 2 A3, C2-C3	VLP	Treatment of distal metaphyseal ulnar #: surgically vs conservatively	QDASH	29
Kwan (106) 2011 Hong Kong	Case study series	Study the efficacy of open reduction and internal fixation by assessing its ability to maintain reduction and evaluating outcomes	Active wrist ROM	75 (41/34)	51 (13-82)	Müller AO: A-C	Angular stable 2.4-mm locking plate fixation: Synthes, Switzerland	Age	DASH	24
Kwok (107) 2011 Hong Kong	Retro	Compare different assessment tools and see which scoring system compared most favorably to the DASH score	NA	108 (42/66)	56 (13-90)	NA	2.4- or 3.5-mm locking plates: Synthes, Switzerland	Age: < 55 vs > 55 Sex Plate type	DASH	21
Lara (108) 2022 ^a USA	RCT 2 TG	Evaluate outcomes after ORIF when using videos alone compared with traditional in-person HT	0-2 wks: short-arm orthosis 2 wks: wrist ROM 3 wks: passive ROM 6 wks: Putty exercises 12 wks: strengthening + ADL	Gr. 1: Digital videos 21 (6/15) Gr. 2: Traditional HT 28 (12/16)	Gr. 1: 54 (46-63) Gr. 2: 58 (46-67)	AO/OTA: Gr. 1 A2-A3, B2-C3 Gr. 2 A2-C3	VLP	Therapy form: Self-directed therapy using digital videos vs traditional in-person HT	QDASH	≥3
Lattmann (109) 2008 Switzerland	Non-RCT	Investigate the influence of the surgical approach on median nerve dysfunction	1-4 wks: cast First d: HT 4 wks: active wrist ROM 6 wks: strengthening + weightbearing exercises	Gr. 1: Carpal tunnel release 83 (22/61) Gr. 2: No carpal tunnel release 91 (18/73)	Gr. 1: 65 (18-89/17) Gr. 2: 64 (24-91/17)	AO Gr. 1 A2-C3 Gr. 2 A2-A3, B2-C3	Locking compression T-plate (LCP), 3.5 mm; 2.4 mm titanium: AO/Synthes, GmbH, Bettlach, Switzerland	Carpal tunnel release: yes vs no Implant type: 2.4 mm vs 3.5 mm Intra-articular extension: yes/no	PRWE	3 6 12
Lattmann (110) 2011 Switzerland	Prosp	Evaluate outcomes after VLP	First d: forearm splint + HT Immediate or at cast removal depending on # pattern and bone quality: active wrist ROM 6 wks: strengthening exercises + weight bearing	245 (60/185)	62 (18-96/SD18)	AO: A2-C3	2.4- or 3.5-mm LC-T plate titanium: Synthes GmbH, Bettlach, Switzerland	Carpal Tunnel Release: yes vs no	PRWE	3 6 12
Lee (111) 2015 Korea	Retro	Evaluate the outcomes of the Frag-Loc® compression screw in # including a displaced dorsoulnar fragment	NA	Gr. 1: Without Frag-log compression screw 26 (8/18) Gr. 2: With a Frag-log compression screw 22 (6/16)	Gr. 1: 60 (48-84) Gr. 2: 64 (48-72)	AO/OTA: C1-C2	Acu-Loc plate: Acumed, Hillsboro, OR, USA	VLP with a Frag-Loc compression screw: yes vs no	DASH PRWE	Gr. 1: 12 Gr. 2: 10
Lee (112) 2016 Korea	Prosp	Compare the outcomes for conservative an operative treatment of DRUJ instability according to the presence/absence and type of ulnar styloid process # and the degree of displacement	<i>Conservative treatment of DRUJ</i> 0-min 4 wks: sugar-tong splint Min 4-8 wks: removable short arm splint 4 wks: wrist flexion/extension ROM <i>Surgical treatment of DRUJ</i> 0-4 wks: sugar-tong splint 4 wks: wrist flexion/extension ROM	157 (56/101)	58	NA	A-LCP 2-Column VDRP: Synthes, Oberdorf, Switzerland or Acumed Acu-Loc: Acumed, Hillsboro, OR or VariAx: Stryker Leibinger GmbH & Co KG, Freiburg, Germany	Treatment of ulnar styloid #: conservative vs operative Displacement of the ulnar styloid # Presence/absence of ulnar styloid # Ulnar styloid # level	DASH	12 17
Lee (19) 2016 Korea	Prosp	Identify factors affecting outcomes in patient with a dorsally angulated #	0-2 wks: below-elbow splint 2 wks: active/passive wrist ROM + ADL	89 (19/70)	58 (28-78)	AO/OTA: A, C	2.4-mm, VA-LCP two column volar plate: DepuySynthes, Paoli, PA, USA	Age Sex Fractured hand: dominant vs non-dominant # mechanism (low/high energy trauma) # classification (AO/OTA) Diabetes: yes vs no Associated ulnar #: tip vs base vs head/shaft Radial height Radial inclination Ulnar variance Volar tilt angle	DASH	12

Lee (20) 2018 Korea	Retro	Investigate the effect of osteoporosis on outcomes in women >50 years	0-2 wks: below-elbow orthosis 2 wks: active/passive wrist ROM + ADL	Gr. 1: Without osteoporosis 49 (0/49) Gr. 2: With osteoporosis 30 (0/30)	Gr. 1: 62 (7) Gr. 2: 66 (8)	AO/OTA: A, C	VLPs: Depuy Synthes, Paoli, PA, or Medartis, Basel, Switzerland	Osteoporosis: no (T score > -2.5) vs yes (T score ≤ -2.5) Age Fractured hand: dominant vs non-dominant AO/OTA classification Diabetes mellitus Associated ulnar styloid process fracture Cortical thickness on CT	DASH	12
Lizaur-Utrilla (113) 2020 Spain	Prosp	Assess outcomes for displaced complete intra-articular # in elderly as compared to younger patients	Plaster splint for 1 wk followed by PT	Gr. 1: ≥65 70 (20/50) Gr. 2: <65 46 (18/28)	Gr. 1: 69 (66-81) Gr. 2: 42 (19-63)	AO: C1-C3	Acu-Loc: Acumed, Hillsboro, USA	Age: ≥65 vs <65	DASH PRWE	6 12 31
								Age Ulnar variance >3mm	DASH PRWE	31
Lozano-Calderón (114) 2008 USA	RCT 2 TG	Compare mobilization within 2 wks (early motion) or at 6 wks (late motion)	0-8 ds: Splint 8 ds: custom thermoplastic splint + active forearm ROM + light functional task + HT <i>Late mobilization</i> splint except when showering 6 wks: wrist ROM <i>Early mobilization</i> 8 ds: removal of the splint + wrist ROM + ADL	Gr. 1: Early motion 30 (11/19) Gr. 2: Late motion 30 (10/20)	Gr. 1: 55 Gr. 2: 51 Both groups: 53 (25-83)	AO: A-C	Gr. 1: Hand Innovations DVFRP: Miami, Florida or Synthes 2.4-mm LCP VCDRP: Synthes, Paoli Pennsylvania or Acu-Loc Targeted DRP: Acumed, Hillsboro, OR Gr. 2: Hand Innovations DVFRP: Miami, Florida or 2.4-mm LCP VCDRP: Synthes, Paoli, PA	Initiation of wrist ROM: early (8 days) vs late (6 weeks)	DASH	3 6
Luo (13) 2018 China	Non-RCT	Evaluate pain management in the immediate period after surgery	First d: home exercise therapy + written PT advice	Gr. 1: Celecoxib 149 (34/115) Gr. 2: Buprenorphine 89 (21/68) Gr. 3: Ibuprofen 77 (19/58)	Gr. 1: 56 (15) Gr. 2: 55 (16) Gr. 3: 55 (17)	AO: A2-C3	DVRP: Zimmer Biomet	Pain medication 2 weeks after surgery: 200mg celecoxib twice per day vs buprenorphine transdermal patch at 5ug/h vs 13mg codeine plus 200mg ibuprofen twice per day	DASH PRWE	3 6
LV (115) 2017 China	Retro	Evaluate type C # involving the lunate facet comparing them with those without involvement of the lunate facet	Type C3.3 # plaster cast/splint. When bony callus on radiographs: wrist ROM	Gr. 1: Die-punch 21 (15/6) Gr. 2: Non-die-punch 46 (30/16)	Gr. 1: 39 (14) Gr. 2: 41 (16)	AO/AFIF: C1-C3	T-shape VLP: SynthesTM, Shanghai, China; WegoTM, Shandong, China	Die-punch with involvement of lunate facet vs non-die-punch without involvement of lunate facet	DASH	14
Löw (116) 2020 Germany	RCT 2 TG	Examine whether closed reduction prior to cast application affect pain perception and clarify whether a prolonged time of displacement leads to poorer results	0-2/4 wks: below-elbow cast 2/4 wks: PT	Gr. 1: Closed reduction pre-surgery 22 (3/19) Gr. 2: No closed reduction pre-surgery 25 (8/17)	Gr. 1: 69 (11) Gr. 2: 66 (16)	NA	IXOS plate or 2-column plates	Closed reduction before surgery: yes vs no	DASH	3 12
Ma (117) 2017 China	RCT 2 TG	Evaluate whether brachioradialis release during type C # fixation affects function and makes the reduction/fixation easier	0-2 wks: splint 2 wks: active ROM	Gr. 1: Brachioradialis release 37 (20/17) Gr. 2: Brachioradialis preservation 37 (18/19)	Gr. 1: 50 (14) Gr. 2: 50 (16)	AO: C1-C3	2.4-mm VCP: Synthes, GmbH, Switzerland	Brachioradialis: release vs preservation	DASH PRWE	6 12
MacFarlane (118) 2015 UK	Retro	Ascertain the patient reported function, the time taken to return to work, and the complication rate	0-2 wks: plaster of paris 2-6 wks: removable splint	187	57 (16-93)	AO: A3, B2-C3	DVRP: Biomet, Bridgend, UK	Surgery after injury: within 14 days vs more than 14 days	PRWE	31
Machado (119) 2012 Brazil	Retro	Evaluate the results using the DASH questionnaire and the radiographic correlation with the Lidström classification	NA	30 (16/14)	51 (20-84/3)	NA	Fixed-angle VLP	Gender Fractured dominant hand Fracture type Age	DASH	18
Marchewka (16) 2021 Poland	Retro	Assess long term outcomes of operative and nonoperative treated # among young and elderly adults	NA	101 (30/71)	65 (18)	AO: A-C	A-VLP	Age: ≥50 vs <50 Sex Injured side Dominant hand DRF Education Smoking status Work status (employed/unemployed/retired) Comorbidities Energy of injury: low (fall from standing height) vs high (fall from greater than standing height) Fracture type	DASH PRWE	47
Marlow (120) 2012 UK	Retro	Compare outcomes of fixed angle and variable angle plate fixation	0-2wks: immobilization 2 wks: active ROM	Gr. 1: Variable angle locking plate 65 (14/51) Gr. 2: Fixed angle locking plate 42 (12/30)	Gr. 1: 58 (18-92) Gr. 2: 56 (19-87)	AO: A-C	Gr. 1: VA-LCP: 1.6 mm Aptus: Medartis, Switzerland Gr. 2: Fixed angle VLP: 2.5 mm DVFRP: DePuy, Warsaw, IN, USA	Plate type: variable angle locking plate vs fixed angle locking plate	QDASH	Gr. 1: 17 Gr. 2: 33

Muccioli (121) 2020 France	Case study series	Reduce and stabilize the die-punch fragment by placing a compression screw in the most medial epiphyseal hole of the plate	NA	Gr. 1: Locking screw 10 (5/5) Gr. 2: Double-threaded compression screw 9 (5/4)	Gr. 1: 62 (28-91) Gr. 2: 56 (24-80)	AO: Gr. 1 C1-C3 Gr. 2 C1-C2	VLP: Initial R1, Newclip TechnicsTM, Haute Goulaine, France	Die-punch fragment fixated with: locking screw vs double-threaded compression screw	PRWE QDASH	6
Mulders (122) 2019 The Netherlands	RCT 1 TG	Compare the outcomes of VLP fixation with plaster immobilization	0-6 wks: use of the wrist without non-bearing exercises. PT at the discretion of the patient and treating physician	65	NA	AO/OTA: A2-A3	VLP	Surgery: primary vs subsequent	DASH PRWE	3 6 12
Mulders (123) 2020 The Netherlands	RCT 1 TG	Present a health economic evaluation of VLP fixation compared to plaster immobilization	0-6 wks: use of the wrist without non-bearing exercises. PT at the discretion of the patient and treating physician	47 (16/31)	59 (42-66)	NA	VLP	Employment: paid vs not paid Age: ≤60 vs >60	DASH	12
Obata (124) 2020 Japan	Prosp	Compare the treatment strategy between dorsal displaced and volar displaced # accompanied by volar lunare facet fragment	First d: wrist ROM	Gr. 1: Dorsal displaced # 13 Gr. 2: Volar displaced # 12 Both gr. 25 (14/11)	Both groups: 58	AO: Gr. 1 C1-C3 Gr. 2 B3, C1, C3	Gr. 1: VA-TCP 2.4: Depuy Synthes, Tokyo, Japan or DVFRP: Zimmer Biomet, Tokyo, Japan or Acu-Loc 2 proximal plate: Acumed, Osaka, Japan or Stellar 2: HOYA, Tokyo, Japan	Proximal VLP to dorsal displaced # vs distal VLP to volar displaced #	QDASH	12
Okoli (125) 2021 USA	Prosp	Evaluate the outcomes of conservatively treated ulnar styloid #	NA	134 (23/111)	Median: 63 (18-92)	NA	VLP	Ulnar styloid #: yes vs no Ulnar styloid #: base vs tip	PRWE QDASH	3 14
								Ulnar styloid #: no vs base vs tip	PRWE QDASH	14
Pathak (126) 2019 India	Non-RCT	Evaluate the influence of PQ repair on outcomes and complications	0-1/2 wks: below elbow slab 1/2 wks: PT + wrist/forearm ROM. 4 wks: strengthening and resistance exercises 12 wks: work hardening program	Gr. 1: PQ repair 29 (11/18) Gr. 2: No PQ repair 34 (13/21)	Gr. 1: 55 (24-77) Gr. 2: 49 (22-72)	NA	VLP	PQ release: repair vs no repair	DASH	3 6 Gr. 1: 35 Gr. 2: 39
Patino (127) 2020 Argentina	Prosp	Determine if there are differences in functional results and compare the results according to # type	0-2 wks: plaster splint First d: wrist ROM	39 (19/20)	60 (18-86)	AO: A2-C3	VLP with fixed-angle distal screws	AO # type: A, B, C	DASH	46
Perugia (128) 2017 Italy	RCT 2 TG	Evaluate findings between # treated with CarboFix VLP or Acu-Lock VLP	0-2 wks: short arm plaster splint 2-4 wks: prefabricated orthosis 2 wks: ROM + PT	Gr. 1: CarboFix 15 (5/10) Gr. 2: Acu-Lock 15 (4/11)	Gr. 1: 57 (32-71/7) Gr. 2: 53 (35-64/8)	AO/ASIF: Gr. 1 B1-C3 Gr. 2 B1, B3-C3	Gr. 1: CarboFix Orthopedics Ltd., Herzeliya, Israel Gr. 2: Acu-Lock VDRP: Acumed Ltd., Hillsboro, Oregon, USA	VLP type: CarboFix vs Acu-Lock	DASH	16
Phadnis (129) 2012 UK	Retro	Assess the outcomes and establish if any factors affected the outcomes and compare the results with those of other studies	Immobilization according to the operating surgeon's preference	180 (51/132)	62 (16-93/18)	AO/ASIF: A1-C3	Stryker Matrix Smartlock VLP: Stryker Leibinger GmbH & Co. Germany	Male/female Surgeon grade Immobilization: 4-6 wks vs immediate graduated mobilization # types (AO-ASIF) Time to surgery Age	QDASH	30
Pire (130) 2017 France	Case study series	Compare outcomes of minimal invasive plate osteosynthesis (MIPO) versus conventional Henry's approach using a long VLP	Early post-operative ROM (n=26)	Gr. 1: MIPO 15 (9/6) Gr. 2: Henry's approach 16 (7/9)	Gr. 1: 56 (23-83) Gr. 2: 69 (24-87)	AO: A2-A3, C1-C3	A-VLP	Long VLP: MIPO vs Henry's approach	QDASH	Gr. 1: 4 Gr. 2: 6
Poiset (131) 2019 USA	Non-RCT	Investigate the effect of the postoperative dressing	0-10/14 ds: plaster splint or soft dressing 10/14 ds: removable wrist splint and supervised therapy. Weening out of the splint over the next mo.	Gr. 1: Plaster splint 79 (14/65) Gr. 2: Soft dressing 60 (8/52)	Gr. 1: 61 Gr. 2: 59	AO: A-C	VLP	Postoperative dressing: plaster splint vs soft dressing	DASH PRWE	3
Quadlbauer (132) 2017 Austria	RCT 2 TG	Compare immediate mobilization with 5 wks immobilization	Early mobilization 0-1 wk: thermoplastic splint 1 wk: OT/PT + ROM Late mobilization 0-5 wks: non-removable plaster cast 5 wks: OT/PT + ROM	Gr. 1: Early mobilization 15 (2/13) Gr. 2: Late mobilization 13 (2/11)	Gr. 1: 49 (15) Gr. 2: 59 (12)	AO: Gr. 1 A2, B3-C3 Gr. 2 C1-C3	APTUS 1.6 distal radius VLP: Medartis, Basel, Switzerland	Mobilization after surgery: 1 d vs 5 wks	PRWE QDASH	3 6 12
Quadlbauer (133) 2020 Austria	Retro	Investigate correlations between radiological and clinical outcomes	0-5 wks: thermoplastic splint or nonremovable plaster cast 5 wks: wrist ROM + HT	230 (76/154)	59 (18-83/14)		Medartis Aptus: Medartis, Basel, Switzerland	Processus styloideus ulnae #: yes vs no fracture Age: <65 vs ≥65 Gender Ulnar styloid #: tip vs. base	PRWE QDASH	20
Roh (39) 2014 South Korea	Prosp	Evaluate the effect of preoperative anxiety and catastrophic pain ideation on perceived disability and objective measures	0-2 wks: short-arm orthosis 2 wks: PT + active/passive ROM	121 (54/67)	53 (14)	AO: A-C	A-VLP	Hand: injured vs uninjured Pain Anxiety Symptoms Scale (PASS) Pain Catastrophizing Scale AO # type: A, B, C Body mass index (BMI) Sex Age	MHQ	3 6

Roh (28) 2014 South Korea	Prosp	Evaluate the factors influencing delayed functional recovery	0-2 wks: short-arm splint 1-2/3 wks: removable orthosis 2/3 wks: active/passive wrist ROM	122 (54/68)	59 (8)	AO: A-C	VLP	Age Sex Bone mineral density (BMD) Fractured hand: dominant vs nondominant Type of # (AO classification) Energy of trauma: high vs low Time to surgery Duration of immobilization	MHQ	3 6 12
Roh (27) 2017 South Korea	Prosp	Compare outcomes in patients with or without low appendicular lean mass plus slowness or weakness	NA	Gr. 1: Sarcopenia 42 (17/25) Gr. 2: No sarcopenia 115 (41/74)	Gr. 1: 64 (6) Gr. 2: 60 (6)	AO: A-C	Synthes 2.4 LCPDR Oberdorf, Switzerland or Medartis Aptus Radius 2.5: Basel, Switzerland	Sarcopenia (low lean mass plus slowness or weakness): yes vs no	MHQ	6 12
								Sex Age # type (AO classification) Affected side: dominant/nondominant Time to surgery Appendicular lean mass Grip strength (non fractured hand) Gait speed	MHQ	12
Ruckenstuhl (134) 2019 Austria	Retro	Investigate if obese patients (Body Mass index (BMI) ≥ 25) have a worse outcome and reduced HRQOL than normal weight patients	NA	Gr. 1: BMI < 25 24 (7/17) Gr. 2: BMI ≥ 25 29 (11/18)	Gr. 1: 60 (21) Gr. 2: 63 (16)	AO: C1-C3	Volar plating: I.T.S. Implant-Technologie-Systeme, Lassnitzhoehe, Austria	BMI: <25 vs ≥ 25	DASH	84
Rundgren (135) 2019 Sweden	RCT 2 TG	Investigate the impact of regional anesthesia (RA) vs general anesthesia (GA) on postoperative outcomes	0-2 wks: splint	Gr. 1: RA 44 (11/33) Gr. 2: GA 44 (10/34)	Gr. 1: 55 (21-74) Gr. 2: 55 (29-74)	OTA/AO: A-C	Volar plating: I.T.S. Implant-Technologie-Systeme, Lassnitzhoehe, Austria	Anesthesia: RA vs GA	PRWE	6
Sammer (136) 2009 USA	Prosp	Examine the effect of ulnar styloid # in patients with a stable DRUJ	At 1 wk: custom made wrist splint + HT + active wrist/forearm ROM	Gr. 1: Ulnar styloid # 88 (32/56) Gr. 2: No ulnar styloid # 56 (16/40)	Gr. 1: 49 (18-86) Gr. 2: 52 (18-83)	AO: A-C	DVR Anatomic Volar Plating System, DePuy Orthopaedics, Inc.	Ulnar styloid #: yes vs no Ulnar styloid # displacement: 0-0.9 vs 1-1.9 vs ≥ 2 mm Percent of styloid # involved: <75% vs 75-100% Income: \$70,000 per year vs >\$70,000 per year Sex Age Race: white vs non-white Education level: no college vs college vs professional/ graduate degree	MHQ	3 6 12
Selles (137) 2020 The Netherlands	RCT 2 TG	Determine the difference in outcome after surgery with or without arthroscopy	Immediate ROM and non-weight-bearing exercises for 6 wks. PT at the discretion of the surgeon	Gr. 1: With arthroscopy 25 (9/16) Gr. 2: Without arthroscopy 25 (9/16 ^a)	Gr. 1: 60 (36-66) Gr. 2: 58 (47-65)	AO/OTA: C	A-VLP	Surgery with arthroscopy: yes vs no	DASH PRWE	3 6 12
Shauver (138) 2014 USA	Prosp	Explore the role functional measures play in total Michigan Hand Questionnaire score	Splinting 1 wk: wrist ROM	207 (68/139)	50 (18-85)	NA	VLP	Age Education Income	MHQ	3 6
Sirio (139) 2019 Finland	RCT 2 TG	Compare functional results in patient ≥ 50 years with either early palmar plating or primary nonoperative treatment	0-10 ds: plaster cast 10 ds: wrist ROM	Gr. 1: Early surgery 38 (1/37) Gr. 2: Delayed surgery 16	Gr. 1: 62 (50-79)	AO: Gr. 1 A, C	Gr. 1: Fixed-angle plate; Aculoc or Aculoc 2; Acumed, Hillsboro, OR, USA	Surgery: early (within 1 wk) vs delayed (1-3 wks)	DASH	24
Solarino (140) 2016 Italy	Retro	Compare the results of # treated with percutaneous Epiblock system vs VLP fixation	Unstable DRUJ 0-3 wks: cast Stable DRUJ Immediate active wrist ROM	50	NA	AO/OTA: A2-A3, C1-C3	Variable angle VLP	AO # type: A2-A3 vs C1-C3	DASH	46
Sonderegger (141) 2010 Switzerland	Prosp	Evaluate the results of using a fixed-angle plate system with the possibility of multidirectional screw fixation	0-6 wks: removable thermoplastic short arm splint. 1 wk: active ROM + HT. 6 wks: strengthening exercises	62 (21/41)	58 (20-89)	AO: A2-C3	Aptus Radius 2.5 mm: Medartis, Basel, Switzerland	Extraarticular # vs intraarticular #	DASH	15
Sonntag (142) 2019 Denmark	RCT 2 TG	Determine the outcome of repairing PQ	0-2 wks: forearm splint 2-5 wks: removable cast + active ROM. 5 wks: load bearing	Gr. 1: No PQ repair 36 (10/29) Gr. 2: PQ repair 36 (5/31)	Gr. 1: 64 (16) Gr. 2: 62 (11)	AO: A2-C3	Gr. 1: VariAx Distal Radius, Anatomical Volar Plate: Stryker, Freiburg, Germany or VA- LCP Two- Column VDRP 2.4: DePuy Synthes, Oberdorf Switzerland Gr. 2: VariAx Distal Radius, Anatomical Volar Plate: Stryker, Freiburg, Germany	PQ repair: yes vs no	DASH PRWE	3 6 12

Sorensen (143) 2020 Denmark	RCT 2 TG	Investigate whether early mobilization improved outcomes	<i>Early mobilization</i> First d: wrist ROM + lightweight ADL + HT 6-12 wks: increased weight-bearing	Gr. 1: Early mobilization 47 Gr. 2: Late mobilization 48	Gr. 1: 67 (8) Gr. 2: 37 (9)	AO: Extra-articular, partial articular, complete articular	VLP with locking screws	Mobilization: early (first post-operative day) vs late (after 2 weeks)	DASH	3 6 12
Souer (144) 2009 USA	Prosp	Investigate the incidence of volar marginal articular # with and without a concomitant # of the dorsal metaphyseal cortex	NA	Gr. 1: AO type B 20 (11/9) Gr. 2: AO type C 37 (13/24)	Gr. 1: 49 (20-80) Gr. 2: 50 (18-80)	AO: Gr. 1 B Gr. 2 C	Gr. 1: 2.4-mm LCP; Synthes, Paoli, Pennsylvania or 3.5-mm LCP; Synthes or DVR; Hand Innovations, Miami, Florida Gr. 2: 2.4-mm LCP or 5-mm LCP or DVRP	AO classification: B vs C	DASH	12 24
Souer (145) 2009 USA	Case contr ol	Compare matched cohorts with and without an untreated ulnar styloid base #	NA	Gr. 1: Untreated ulnar styloid # 224 (84/140) Gr. 2: No ulnar styloid # 150 (50/100)	Gr. 1: Styloid tip #: 51 Styloid base #: 54 Ulnar neck #: 64 Gr. 2: 53	AO: A-C	A-VLP	Ulnar styloid #: untreated # vs no # Ulnar styloid # displacement: < 2mm vs ≥ 2 mm	DASH	12 24
Souer (146) 2010 USA	Retro	Compare the use of a titanium 2.4-mm precontoured plate with that of a stainless-steel oblique 3.5-mm T-shaped plate in AO-type A3.2 #	0-10 ds: splint 10 ds-6 wks: removable thermoplastic splint. 6 wks: active ROM	Gr. 1: 2.4 mm plate 24 (8/16) Gr. 2: 3.5 mm plate 38 (10/28)	Gr. 1: 58 (13) Gr. 2: 59 (13)	AO: A3	Gr. 1: 2.4-mm precontoured titanium LCP; Synthes, Paoli, PA Gr. 2: 3.5-mm stainless-steel oblique T-shaped plate; Synthes, Solothurn, Switzerland	Plate type: 2.4-mm Titanium Versus 3.5-mm Stainless-Steel	DASH	12 24
Souer (14) 2011 USA	RCT 2 TG	Investigate whether there are differences in outcomes between patients prescribed OT and those prescribed independent exercises	<i>Independent exercises:</i> Wean out of a wrist splint when full finger and forearm motion were obtained and then active/passive wrist ROM. Were guided to have an athletic healthy stretch mindset, in which pain was seen as part of recovery <i>OT group:</i> Supervised exercises	Gr. 1: Independent exercises 48 (17/31) Gr. 2: OT 46 (16/30)	Gr. 1: 49 Gr. 2: 51	AO: A-C	VLP	Independent exercises vs OT Agreement with 'no pain, no gain' Arc of wrist flexion and extension Center for Epidemiologic Studies-Depression questionnaire (CES-D) Pain Anxiety Symptoms Scale (PASS) Pain Catastrophizing Scale (PCS) Days to surgery Pain at rest	DASH	3 6
Stuby (147) 2015 Germany	RCT 2 TG	Examine the outcomes of dynamic postoperative immobilization compared to customary plaster cast immobilization	0-1 wk: VacoHand orthosis or forearm plaster splint 1-4 wks: splints were crossed <i>Plaster of Paris</i> 2-4 wks: ROM out of splint + PT <i>VacoHand orthosis</i> 2-4 wks: limited ROM in orthosis + PT	Gr. 1: VacoHand 15 (5/10) Gr. 2: Plaster of paris 14 (3/11)	Gr. 1: 51 (15) Gr. 2: 45 (17)	AO: A-C	3.5mm distal radius VLP: Königsee, or 3.5mm distal radius VLP LCP: Depuy/Synthes	Postoperative immobilization: VacoHand orthosis vs forearm plaster splint	DASH	3
Sugiyama (148) 2018 Japan	Retro	Survey the presence or absence of pisiforme subluxation and investigate whether the outcome differs due to the presence of pisiforme subluxation	Return to ADL and limb load according to pain	Gr. 1: Subluxation of os pesiform 31 (15/16) Gr. 2: No subluxation of os pesiform 103 (38/65)	Gr. 1: 61 (18) Gr. 2: 64 (15)	AO: Gr. 1 A2-A3, B2-C3 Gr. 2 A3, B2-C3	VLP	Os pisiform subluxation: presence vs absence	QDASH	3
Swart (149) 2017 USA	Prosp	Assess the overall incidence of scapholunate interosseous ligament (SLIL), TFCC and chondral surface injuries, and investigate if radiographic parameters predict outcomes and whether ligament and chondral injuries affect outcomes	0- 10/14 ds: splint 10/14 ds: removable splint + OT + active/passive ROM. 6 wks: splint removal + strengthening	42 (12/30)	57 (20-85/16)	AO/ASIF: A-C	VLP	Ligament injury: no vs TFCC vs SLIL vs TFCC+SLIL	DASH	12
Tahir (150) 2020 Pakistan	RCT 3 TG	Compare various parameters, clinical outcomes and costs of general anesthesia (GA), Bier's block and WALANT	First d: wrist flexion/extension 4 ds: resume work according to patient's convenience and the nature of their work 2 wks: PT + ROM + strengthening	Gr. 1: GA 56 (28/28) Gr. 2: Bier's block 58 (33/25) Gr. 3: WALANT 55 (31/24)	Gr. 1: 50 (9) Gr. 2: 48 (9) Gr. 3: 47 (11)	AO: A2-B1, B3-C3	VLP: Double Medical Technologies, Fujian, China	Type of anesthesia: GA vs Bier's block vs WALANT	PRWE QDASH	12
Tarallo (151) 2011 Italy	Case study serie s	Investigate the long-term outcomes of C1 and C2 #	0-2 wks: plaster valve 2 wks: wrist ROM	Gr. 1: AO C1 18 (5/13) Gr. 2: AO C2 22 (12/10)	Gr. 1: 59 (15-79) Gr. 2: 51 (34-79)	AO: Gr. 1 C1 Gr. 2 C2	DVRP	AO # type: C1 vs C2	DASH	Gr. 1: 18 Gr. 2: 20

Teunis (152) 2017 Switzerland	Prosp	Compare the # positions and compare the radiological and clinical outcomes following treatment with single and double rows of distal screws	Treatment was at the surgeon's discretion, but most often active ROM within a couple of days HT if necessary	73 (24/49)	61 (28-88/15)	AO: B1, C1-C3	2.4 mm Variable angle locking 2-column volar DRP: Synthes, Oberdorf, Switzerland	Distal screws in volar locking plates: single vs double rows	PRWE	12
Teunis (29) 2021 USA	Prosp	Evaluate the associations between radiographic, CT, and Q3DCT measures and change in patient-reported disability	Early active ROM HT if necessary	71 (24/47)	60 (25-87/15)	AO/OTA: B3-C3	VLP	Posteroanterior radial height Posteroanterior ulnarward inclination Posteroanterior ulnar variance Posteroanterior gap Posteroanterior step off Lateral palmar tilt Lateral gap Lateral step off Lateral scapholunate angle Lateral teardrop angle Lateral AP distance Sagittal step off Sagittal gap Axial gap Frontal step off Frontal gap Quantitative 3-DCT Number of fragments Mean fragment surface area Surface area of gap 3-D vector displacement Age Sex Body mass index Tobacco use (yes/no) Mechanism of injury (fall from standing height/traffic accident/other) Injured dominant side (yes/no) AO # classification (B3/C1/C2/C3) Ulna # (yes/no) Closed deduction prior to surgery (yes/no)	PRWE	3 12
Tomruk (153) 2020 Turkey	RCT 2 TG	Investigate the effects of effects of early active mobilization on functional outcomes	<i>Both groups</i> 0-7/10 ds: wrist splint for 7/10 ds: PT + ROM. 8 wks: strengthening exercises <i>Early manual therapy</i> Mulligan MWM technique in addition	Gr. 1: Early manual therapy 15 (8/7) Gr. 2: PT 17 (6/11)	Gr. 1: 45 (10) Gr. 2: 57 (16)	AO: B3-C3	VLP	Therapy: Early manual therapy vs PT	DASH PRWE	3
Tosti (154) 2013 USA	RCT 2 TG	Evaluate outcomes as a function of PQ repair	0-10/14 ds: soft dressing 10/14 ds-6 wks: prefabricated orthosis (optional) + HT. 2 wks: wrist ROM. 6 wks: strengthening + resistance exercises. 12 wks: work hardening program	Gr. 1: PQ repair 24 (6/18) Gr. 2: No PQ repair 33 (9/24)	Gr. 1: 60 (30-89/14) Gr. 2: 51 (16-83/19)	AO: A-C	Variable-angle VLP: Medartis APTUS plate: Kennett Square, PA or Synthes 2.4 Variable-Angle LCP 2-column plate: Paoli, PA	PQ repair: yes vs no	DASH	3 12
Tulipan ^a (155) 2022 USA	Retro	Evaluate outcomes in patients ≥75 years of age compared to patients aged 65-74 years	0-1 wk: plaster orthosis 1 wk: custom-made thermoplastic orthosis + OT	Gr. 1: Age 65-74 years 51 (4/47) Gr. 2: Age ≥75 24 (2/24)	Gr. 1: 65 (65-73) Gr. 2: 80 (75-88)	AO: 1-3	VLP	Age: 65-74 vs ≥75 Age Preoperative dorsal angulation Preoperative articular step-off	QDASH	13
Uchiyama (44) 2013 Japan	Non-RCT	Determine whether early administration of alendronate (ALN) delays # healing	0-2 wks: splint 2 wks: unrestricted use of the hand	Gr. 1: Alendronate 40 (2/38) Gr. 2: No alendronate 40 (2/38)	Gr. 1: 70 (53-85) Gr. 2: 70 (52-86)	AO: Gr. 1 A2-A3, C1-C2 Gr. 2 A2-B1, B3-C2	VLP	Administration of alendronate: early (few days post-op) vs delayed (4 months)	QDASH	3 4 5 6
Valdes (156) 2015 USA	RCT 2 TG	To evaluate if there were differences in outcomes between patients who received supervised therapy and those having monitored home exercises	Instructions in a home ROM program. <i>Clinic-based therapy</i> Active/passive ROM, joint mobilization, stretching exercises + ADL <i>Home-based therapy</i> Self-progression of the home exercise program	Gr. 1: Clinic-based therapy 31 (2/29) Gr. 2: Home-based therapy 19 (6/13)	Gr. 1: (28-81) Gr. 2: (23-92)	NA	VLP	Age Therapy: clinic-based vs supervised home-based Edema Grip strength Flexion to the palmar crease	PRWE/ PRWHE PRWE/ PRWHE	3 6
van Leeuwen (157) 2021 Switzerland	Non-RCT	Compare the one-stage with a two-stage procedure regarding outcomes	Removable splint for 6 wks	Gr. 1: One stage ORIF 187 (74/113) Gr. 2: Temporary external fixation before ORIF 66 (29/37)	Gr. 1: 56 (17) Gr. 2: 54 (20)	AO/OTA: C2-C3	Medartis: Medartis AG, Basel, Switzerland or DePuy Synthes: Synthes GmbH, Zuchwil, Switzerland	Definitive ORIF: one stage vs temporary external fixation (two stage)	PRWE	12
Vernet (158) 2020 France	Retro	Assess medium-term results of minimally invasive plate osteosynthesis (MIPO)	Encouragement of gentle ROM	710	58 (18-95)	AO: A-C	A-VLP	AO # type: A and B vs C	PRWE QDASH	7
Vitale (159) 2016 USA	Retro	Determine whether patients with disruption of the articular surface of the sigmoid notch were more likely to develop DRUJ arthritis and self-report worse outcomes compared with patients without involvement of the sigmoid notch	NA	Gr. 1: Sigmoid notch not involved 14 (2/12) Gr. 2: Sigmoid notch involved 19 (2/17)	Gr. 1: 54 (9) Gr. 2: 53 (12)	NA	VLP	Sigmoid notch involved: yes vs no Sigmoid notch coronal step-off: >1.0 mm vs ≤1.0 mm Sigmoid notch axial step-off: >1.0 mm vs ≤1.00 mm Sigmoid notch coronal or axial diastasis: >1.0 mm vs ≤1.0 mm DRUJ subluxation: ≤10% vs <10%	DASH	76

von Recum (160) 2012 Switzerland	Retro	Investigate the outcomes after using 2 different models of a single implant type	NA	Gr. 1: LCR DR 2.4 mm 61 (19/42) Gr. 2: LCR DR 3.5 mm 75 (21/54)	Gr. 1: 52 (18-78/15) Gr. 2: 56 (25-80/16)	AO: C1-C3	LCPDR: Synthes AG, Bettlach, Switzerland	LCP DR: 2.4 mm vs 3.5 mm	DASH	12 24
Wang * (161) 2022 USA	Prosp	Identify the radiographic incidence of SL widening and associations between # class pattern and SL widening, and determine the outcomes of # with an untreated SL widening	NA	Gr. 1: No SL widening 86 (14/72) Gr. 2: SL widening 31 (6/25)	Gr. 1: 61 (16) Gr. 2: 65 (10)	AO: A-C	VLP	SL widening: yes/no	PRWE QDASH	3 15
Watson (162) 2018 Australia	RCT 3 TG	Seek evidence on the effects of the immobilization period	0-1 wk: below-the elbow splint <i>1-wk immobilization</i> 1-7 wks: PT + ROM <i>3-wks immobilization</i> : 1-3 wks: circumferential cast 3-9 wks: PT + ROM <i>6-wks immobilization</i> 1-6 wks: circumferential cast 6-12 wks: PT + ROM	Gr. 1: 1-week 46 (17/29) Gr. 2: 3-weeks 41 (10/31) Gr. 3: 6 weeks 46 (21/25)	Gr. 1: 54 (16) Gr. 2: 51 (15) Gr. 3: 52 (16)	AO: A2-C3	VLP	Wks of immobilization: 1, 3, or 6	DASH PRWE	3 6
Xavier (163) 2011 Brazil	Retro	Evaluate and correlate outcomes with radiographic indexes	0-10 ds: forearm splint 10 ds: OT + active/passive wrist ROM	64 (20/44)	58 (19-86)	AO: A3-C3	T-shaped fixed-angle locked plate 2.4 mm	Age: >60 years vs <60 years	DASH	21
Yamashita (164) 2015 Japan	Retro	Assess the effect of the timing of fixation on function	Free wrist movements	Gr. 1: Early fixation 76 (0/76) Gr. 2: Delayed fixation 30 (0/30)	Gr. 1: 68 (51-80/9) Gr. 2: 67 (51-79/8)	AO/OTA: A2-A3	VDRPS: Stellar plate, Japan Universal Technologies, Inc. Tokyo, Japan	VLP fixation: Early (within 1 day) vs delayed (7-12 days)	DASH	3 Gr. 1: 17 Gr. 2: 19
Yamazaki (165) 2015 Japan	RCT 2 TG	Determine whether fluoroscopically assisted reduction offered comparable outcomes with arthroscopically assisted reduction	0-3 ds: short-arm plaster splint 3 ds: removable short-arm splint + active and wrist ROM + PT. 9 wks: strengthening exercises 12 wks: loadbearing	Gr. 1: Fluoroscopically assisted reduction 34 (9/25) Gr. 2: Arthroscopically assisted reduction 36 (7/29)	Gr. 1: 63 (16) Gr. 2: 64 (14)	AO: C1-C3	Acu-Loc VDR Plate: Acumed, Hillsboro, Oregon or 2.4 mm VA-LCP Two-Column Volar Distal Radius Plate; Synthes GmbH, Oberdorf, Switzerland	# reduction: fluoroscopically assisted vs arthroscopically assisted	DASH	11
Yao (166) 2019 China	Prosp	Introduce a new index which can predict outcomes	0 d: active wrist ROM + PT	56 (26/30)	54 (34-77)	AO: A3, B2-C3	VLP with locking screws	Ratio of soft tissue circumference to bone circumference at the watershed line	DASH PRWE	12
Ydreborg (167) 2015 Sweden	Prosp	Explore differences in outcomes over time	0-2 wks: cast 2-6 wks: removable wrist splint + wrist ROM 6 wks: usual ADL <i>Except 9 patients</i> 8 wks: ADL	101 (19/82)	58 (13)	NA	A-VLP	Age: ≥65 vs <65	DASH	6 24
Yoon (168) 2017 South Korea	Retro	Compare the outcomes of AO type C3 and C2 #	0-4 wks: short arm splint	Gr. 1: AO C3 35 (19/16) Gr. 2: AO C2 50 (17/33)	Gr. 1: 50 (21-69/11) Gr. 2: 56 (20-69/13)	AO: Gr. 1: C3 Gr. 2: C2	2.4 mm VLCP: Synthes GmbH, Oberdorf, Switzerland or VA-LCP two-column distal radius plate: Synthes GmbH, Oberdorf, Switzerland or Medartis Aptus volar plate: Medartis, Basel, Switzerland	AO classification: C3 vs C2 Age Sex Energy of injury: high vs low	DASH DASH	3 24 24
Zeidan (169) 2021 USA	Retro	Evaluate the effect of social deprivation on patient-reported outcomes	NA	98 (22/76)	53 (15)	NA	A-VLP	AAOS alignment fracture parameters: within and not within Area deprivation index # type: extra-articular vs intra-articular Treating service: trauma vs hand service Sex Age	QDASH	37
Zenke (170) 2009 Japan	Prosp	Determine whether the presence of an associated # of the ulnar styloid affects the outcome	4-5 ds: active ROM + PT	Gr. 1: No ulnar styloid # 50 (13/37) Gr. 2: Ulnar styloid base # 41 (20/21) Gr. 3: Ulnar styloid tip # 27 (9/18)	Gr. 1: 66 Gr. 2: 66 Gr. 3: 57	AO: A2-A3, C1-C3	DRV locking plate system: Mizuho Medical Department Instrument Company, Tokyo, Japan or VDRPS: Stellar plate, Japan Universal Technologies, Tokyo, Japan	Ulnar styloid #: no vs base vs tip	DASH	3 6 15
Zenke (171) 2011 Japan	Prosp	Compare outcomes of conventional plate osteosynthesis with minimally invasive plate osteosynthesis (MIPO) using a transverse skin incision without cutting the PQ	Dressing until decreases of swelling. Active wrist ROM and HT	Gr. 1: Conventional plate osteosynthesis 36 (9/27) Gr. 2: MIPO 30 (10/20)	Gr. 1: 65 (18) Gr. 2: 62 (16)	OTA: A2-C2	VDRPS: Stellar plate; Japan Universal Technologies, Tokyo, Japan	Conventional plate osteosynthesis vs MIPO	DASH	3 12

Zenke (172) 2012 Japan	Non-RCT	Clarify whether internal fixation of ulnar styloid basal # had any effect on wrist function	NA	Gr. 1: Ulnar styloid # fixation 20 (2/18) Gr. 2: Ulnar styloid # no fixation 28 (4/24)	Gr. 1: 64 (23-82/16) Gr. 2: 64 (23-85/18)	OTA: A2-C3	VDRPS: Stellar plate, Japan Universal Technologies, Tokyo, Japan	Ulnar styloid basal process #: fixation vs non-fixation Ulnar styloid # with fixation: displacement < 2.0 mm or displacement ≥ 2.0 mm Ulnar styloid # with no fixation: displacement < 2.0 or displacement ≥ 2.0 mm	DASH	3 6 12
Zhang (173) 2020 China	Retro	Compare the radiological parameters and outcomes, and evaluate the potential complications among die-punch fractures	0-4/6 wks: cast 4-6 wks: removal of Kirschner wires + wrist ROM	Gr. 1: Die-punch fracture volar type 19 (7/12) Gr. 2: Die-punch fracture splitting type 24 (10/14) Gr. 3: Die-punch collapsed type 28 (11/17)	Gr. 1: 46 (17) Gr. 2: 44 (15) Gr. 3: 48 (16)	AO: B-C	T-shape VLP: Synthes, Shanghai, China; Wego, Shandong, China	Die-punch #: volar vs splitting vs collapsed	DASH	15
Zhang (174) 2020 China	Non-RCT	Evaluate the results of 2 methods: the brachioradialis splitting technique and the common transverse incision technique for sparing the PQ	0-1 wk: short-arm brace 1 wk: wrist ROM 6 wks: strengthening and resistance exercises 12 wks: work hardening program + discharge from therapy	Gr. 1: Transverse incision 55 (21/34) Gr. 2: Brachioradialis splitting approach 55 (18/37)	Gr. 1: 44 (6) Gr. 2: 43 (8)	AO: A-C	DRP: Sanatmetal Orthopaedic & Traumatologic Equipment Manufacturer Ltd, Hungary	Transverse incision along the border of the PQ vs brachioradialis splitting approach	DASH	3 6 Gr. 1: 35 Gr. 2: 32

^a Available in the databases ahead of print

^b The numbers are adjusted to make the numbers match

^c Plate types:

DRLP: distal radius locking plate
DRP: distal radius plate
DVR: Distal Volar Radius plate
DVLP: distal volar radius plate
LCP: locking compression plate
LCPDR: Locking compression plate distal radius system
VA-LCP: variable angle locking compression plate
VCDRP: volar column distal radius plate
VCP: volar locking compression column plate
VDRP: volar distal radius plate
VDRPS: volar distal radius plating system
VLCP: volar locking compression plate

Abbreviations. #: fracture, ADL: activities of daily living, AAOS: American Association of Orthopedic Surgeons, A-VLP: Assumed a volar locking plates was use, DRF: distal radius fracture, DRUJ: distal radioulnar joint, D(s): day(s), HT: Hand therapy, Mo(s): month(s), OT: occupational therapy, PT: physiotherapy, ROM: range of motion, SL: Scapholunate ligament, TFCC: triangular fibrocartilage complex, TG: Treatment group(s), VLP: volar locking plate, WALANT: wide-awake local anesthesia, Wk(s): week(s)

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