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Acute Posterior Glenohumeral Instability: A Systematic Review and a Treatment Algorithm Proposal

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Abstract

Purpose

Acute posterior shoulder instability is rare and often missed. Treatment is not standardized, and most evidence comes from small series. The purpose of this systematic review was to summarize the clinical and radiological outcomes of acute posterior glenohumeral dislocation and fracture-dislocation treated conservatively or operatively, and to propose a treatment algorithm based on the available evidence and the experience of the authors.

Methods

PubMed, Embase and Scopus were searched for studies published in the last ten years, up to September 2025, following PRISMA 2020. Studies on acute injuries, defined as treatment within six weeks of trauma, with at least 12 months of follow-up were included. Chronic, neglected and recurrent cases were excluded. Two reviewers performed screening, data extraction and risk-of-bias assessment with MINORS. Weighted means were calculated for scores reported by three or more studies.

Results

Seven studies with 81 shoulders were included, 52 treated operatively and 29 conservatively. All were level IV. Mean age was 43.9 years and mean follow-up 72.3 months. The reverse Hill-Sachs lesion was the most common pattern, ranging from 25 to 50% of the humeral head. In the operative group the weighted mean Constant-Murley score was 84.6 and the weighted mean ASES was 86.4, with no redislocations. Avascular necrosis occurred only after fixation of Neer four-part fracture-dislocations. In the conservative group the redislocation rate was 20.7% and the secondary surgery rate 31.0%.

Conclusion

Evidence on acute posterior glenohumeral instability is limited and heterogeneous. The included studies reported satisfactory outcomes after both joint-preserving and reconstructive treatment. A treatment algorithm based on time from injury, adapted gamma angle and humeral head reconstructibility is proposed, derived from the available evidence and the experience of the authors. Prospective validation is required.

Level of evidence

IV

1. INTRODUCTION

Acute posterior glenohumeral dislocation is a rare injury and accounts for 2 to 5% of all shoulder dislocations[5, 33]. When associated with a proximal humerus fracture, it represents less than 1% of shoulder fracture-dislocations[34]. The diagnosis is missed at initial presentation in up to 60 to 80% of cases [14, 33]. The mechanism is indirect axial loading on the adducted, flexed, and internally rotated arm, with high-energy trauma, seizures, and electrocution as the most frequent causes[26, 33].

Acute injuries range from isolated dislocation with a reverse Hill-Sachs lesion (RHSL), with or without posterior capsulolabral injury, to locked humeral head fracture-dislocation with tuberosity, surgical neck, or four-part fractures classified by Neer[27]. RHSL size and fracture pattern guide the surgical treatment[17, 32]. The definition of acute injury is not uniform: Cicak et al. proposed a threshold of 3 weeks from injury, whereas other authors have used 5 or 14 days. Moroder and Scheibel proposed the ABC classification, in which group A comprises first-time acute events up to 3 months from injury[5, 18, 26].

Treatment options include conservative management, modified McLaughlin and lesser tuberosity transfer, posterior capsulolabral repair with suture anchors, osteochondral allograft reconstruction, open reduction and internal fixation, and shoulder arthroplasty in elderly patients with non-reconstructable fractures[4, 6, 7, 9, 10, 19, 30, 33, 36]. These techniques address the glenohumeral structures injured during the acute event, whether the injury involves soft tissue or bone. Yet, the dislocation predisposing factors have received less attention. Gerber and colleagues have shown that posterior glenohumeral stability depends largely on acromial morphology and that a higher and more horizontal acromion with reduced posterolateral coverage fails to contain the humeral head posteriorly. They consider this morphological deficiency a primary contributor to posterior instability and a potential therapeutic target[2, 11, 15, 20]. Whether this anatomical concept has therapeutic implications in the acute traumatic setting remains to be demonstrated.

The treatment algorithm proposed by Paul et al. remains the most cited reference for surgical decision-making in this injury[30]. New surgical techniques, the ABC classification, and longer follow-up data have emerged since then, but the evidence remains limited to small retrospective case series with heterogeneous definitions of acuity and outcome reporting. No recent systematic review has analyzed the data restricted to acute presentations. The present systematic review therefore aims to summarize the clinical and radiological outcomes of acute posterior glenohumeral dislocation and fracture-dislocation treated conservatively or operatively, and to propose a treatment algorithm based on the available evidence and the experience of the authors.

2. METHODS

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines[28].

Search strategy

A systematic literature search was independently conducted by two reviewers (JMH, LJVF) in PubMed, Embase, and Scopus, limited to studies published within the last 10 years, through September 13th, 2025. The search strategy combined the following terms using Boolean operators AND and OR: "shoulder", "glenohumeral", "posterior dislocation", "locked posterior dislocation", "posterior fracture-dislocation", "unreduced posterior dislocation", "neglected posterior dislocation", "reverse Hill-Sachs", and "McLaughlin". Reference lists of all retrieved articles and relevant reviews were manually screened to identify additional potentially eligible studies not captured by the electronic search. The full search strategy for each database is provided in the **Supplementary Table S1**.

Eligibility criteria

Clinical studies reporting outcomes of conservative and/or surgical treatment for acute posterior glenohumeral instability were eligible if: published in English or Spanish; published within the last 10 years; the study population comprised patients with acute posterior glenohumeral instability, defined as posterior dislocation or posterior fracture-dislocation, including reverse Hill-Sachs lesions, treated within six weeks of injury; and clinical and/or functional outcomes were reported using validated patient-reported outcome measures (PROMs) or objective clinical assessments with a minimum follow-up of 12 months. Studies were excluded if they were case reports, surgical technique descriptions, biomechanical or cadaveric studies, or editorial publications. Studies primarily addressing chronic posterior shoulder instability, defined as a diagnostic delay exceeding six weeks, as well as those focused on neglected or recurrent instability, were likewise excluded. This six-week threshold was chosen as a conservative operational definition within the heterogeneous timeframes reported in the literature, and is narrower than the three-month window of group A in the ABC classification. Studies lacking extractable clinical outcome data were also excluded. Titles and abstracts were screened independently by two reviewers (JMH, LJVF), followed by full-text evaluation of potentially eligible records. Disagreements were resolved by consensus; when agreement could not be reached, a third reviewer (TMF) served as arbiter.

Data extraction

Data were independently extracted by two investigators (JMH, LJVF) into a predefined standardized spreadsheet, with discrepancies resolved by consensus. Extracted variables included study characteristics such as author, year of publication, country, and study design, as well as patient demographics comprising sample size, mean age, sex distribution, and follow-up duration. Injury-related data encompassed the mechanism of injury, injury type, time elapsed from injury to treatment, and associated structural lesions, including the size and measurement method of any reverse Hill-Sachs lesion, glenoid defects, and concomitant proximal humerus fractures.

Treatment details recorded included the type of management (nonoperative or operative), the surgical approach, the technique employed, and the implants used. Radiological outcomes collected comprised the imaging modalities used, fracture union, avascular necrosis, osteoarthritis progression, allograft

resorption where applicable, and restoration of glenohumeral centering. Clinical outcomes included the primary validated patient-reported outcome measure (PROM), with pre- and post-treatment values when available; recurrence or instability events; postoperative complications; reinterventions; and return to preinjury activity level.

Outcomes of interest

The primary outcome was functional recovery, measured using validated PROMs, including the Constant-Murley Score, American Shoulder and Elbow Surgeons score (ASES), Western Ontario Shoulder Instability Index (WOSI), Subjective Shoulder Value (SSV), and equivalent instruments when available. Secondary outcomes comprised recurrence of posterior shoulder instability, defined as any new dislocation or symptomatic subluxation occurring between initial treatment and final follow-up, return to preinjury activity level or sport when reported, postoperative complications, reintervention rate, and radiological outcomes including avascular necrosis, osteoarthritis progression, fracture union, glenohumeral centering restoration, and allograft resorption in cases involving biological reconstruction.

Methodological quality and risk of bias assessment

The methodological quality and risk of bias of each included study were independently assessed by two reviewers (JMH, LJVF) using the Methodological Index for Non-Randomized Studies (MINORS), a validated instrument developed specifically for the appraisal of non-randomized surgical studies[35]. Each of the eight items applicable to non-comparative studies was scored from 0 to 2, yielding a maximum total score of 16. Scores were interpreted as follows: good quality (13–16), moderate quality (9–12), and low quality (8 or below). Disagreements between reviewers were resolved by consensus.

Statistical analysis

Continuous variables were reported as means with standard deviations or medians with ranges, as in the original studies. Weighted means were calculated for variables reported by three or more studies, using the number of shoulders as the weighting factor, and were computed separately for the operative and conservative cohorts. Redislocation, AVN, and reoperation were reported as raw proportions per cohort. Reoperation was selected as the primary safety endpoint. A subgroup analysis by treatment strategy was performed; pooled estimates were reported only when two or more studies contributed to a subgroup. Given the clinical heterogeneity of the included studies, weighted means were interpreted as descriptive summaries within each treatment group and not as comparative estimates.

3. RESULTS

The initial literature search yielded 1,104 records. Following the removal of duplicates and records identified by automation tools, 941 records underwent title and abstract screening. Sixty-four full-text reports were assessed for eligibility, of which 57 were excluded because they did not address acute

posterior shoulder instability. Seven studies met the eligibility criteria and were included in the qualitative synthesis (Fig. 1).

Synthesis of results

Seven studies encompassing 81 shoulders were included, of which 52 were managed operatively and 29 conservatively. All were case series or retrospective cohorts classified as level IV evidence. A male predominance was observed across all operative series. The weighted mean patient age across the full cohort was 43.9 years, and the weighted mean follow-up was 72.3 months, ranging from 23.3 months[23] to 128.4 months[18]. Study characteristics (Table 1), radiological findings (Table 2), the distribution of injury patterns (Table 3), risk-of-bias assessment (Table 4), and outcomes (Table 5) are presented below. Detailed surgical technique and rehabilitation protocols (**Supplementary Table S2**), subgroup analysis by treatment strategy (**Supplementary Table S3**), a synthesis of outcome predictors (**Supplementary Table S4**), and individual clinical outcomes and complications by study **(Supplementary Table S5)** are provided as supplementary material.

Injury characteristics and acute injury definition

The definition of acute posterior shoulder instability was inconsistent across the included studies. Four studies applied the Cicak criterion of fewer than 3 weeks from injury to presentation [1, 5, 22, 23, 34]. Konrads et al. defined acute management operationally as surgery performed within 14 days, without reference to any published classification [18]. Festbaum et al. used the ABC classification, including Type A1 (acute subluxation) and Type A2 (acute dislocation)[9, 26]. Park et al. did not provide an explicit definition, though all patients were managed within 5 days of injury [29].

The predominant injury pattern was locked posterior glenohumeral dislocation with a reverse Hill-Sachs lesion (RHSL), reported in six studies. RHSL size ranged from 25 to 50% of the humeral head articular surface. Shen et al. evaluated a distinct injury pattern, namely posterior dislocation associated with proximal humerus fractures. Only five of their six cases qualified as acute, with a mean time from injury to surgery of 5.2 days (range, 2–10), and the remaining patient, who was operated on at 60 days, was excluded from the acute subgroup analysis[34]. The distribution of injury patterns across the included studies, including Neer subtypes where reported, is detailed in Table 3. High-energy trauma was the most common mechanism across operative series; seizure and electrocution were also reported in multiple studies.

Treatment strategies

Six studies described operative management, and one evaluated a primary conservative strategy. Among the operative series[1, 18, 22, 23, 29, 34], most used a deltopectoral approach. Two exceptions are notable: Konrads et al.[18] employed either arthroscopic retrograde elevation or open cortico-cancellous iliac crest grafting based on intraoperative International Cartilage Repair Society (ICRS) cartilage grading, and Shen et al.[34] used a combined posterior axillary and deltopectoral approach, reducing the

dislocated humeral head through the posterior incision and fixing the proximal humerus fracture through the deltopectoral approach.

Surgical technique was dictated by RHSL size and associated fracture pattern. Banerjee et al. performed a modified McLaughlin procedure with lesser tuberosity transfer fixed with one or two bicortical cannulated screws[1]. Marcheggiani Muccioli et al. reconstructed the defect with fresh-frozen humeral head osteochondral allografts secured with two 3.5-mm titanium cancellous lag screws and subscapularis repair using two suture anchors[22]. Morán et al. used headless cannulated compression screws for articular surface reconstruction, lesser tuberosity fixation with cancellous screws or suture anchors, and a PHILOS locking plate when greater tuberosity or surgical neck fractures were present[23]. Shen et al. employed a combined posterior axillary incision for humeral head reduction and a deltopectoral approach for PHILOS plate fixation with posterior capsular suture anchor repair[34]. Lastly, Park et al. performed open reduction and internal fixation (ORIF) with a PHILOS plate in four patients and arthroplasty in two, the latter reserved for elderly patients with Neer four-part fractures [29].

Festbaum et al. managed all 29 shoulders conservatively with immobilization in an abduction pillow or neutral rotation brace for two to six weeks, followed by physiotherapy[9].

Clinical outcomes

Given the substantial heterogeneity in outcome reporting across included studies, results were synthesized narratively using the primary outcome score reported by each study. Operative management yielded satisfactory functional results across most series, with Banerjee et al. and Konrads et al. achieving the highest Constant-Murley scores at final follow-up (median 92 and mean 92.5, respectively), with no redislocation in either series [1, 18]. Konrads et al. additionally demonstrated sustained functional improvement with a mean follow-up of 10.7 years, representing the longest follow-up in this review [18]. Park et al. reported the lowest scores (mean Constant score 66.7), attributable to avascular necrosis (AVN), in two of four ORIF patients with Neer four-part fracture-dislocations [29]. Across the operative cohort, the weighted mean Constant-Murley score was 84.6 (5 studies, n = 40) and the weighted mean ASES was 86.4 (4 studies, n = 35) with no redislocation recorded in any operatively managed shoulder (Table 1, Table 5).

Conservative management was reported in a single series. Festbaum et al.[9] achieved good outcomes in 69% of shoulders, with redislocation in 20.7% and secondary surgery in 31.0% (Table 5). In this cohort, older age at dislocation correlated with better functional scores [9]. Subgroup analysis by treatment strategy is detailed in **Supplementary Table S3.**

Radiological outcomes

Glenohumeral reduction and joint centering were restored in all operative series reporting this outcome, and fracture union was achieved in all ORIF patients across studies that reported this endpoint (Table 2). AVN was absent in five of six operative series and occurred exclusively in Park et al., in two of four ORIF

patients with Neer four-part fracture-dislocations, both associated with intra-articular screw penetration[29]. Osteoarthritic progression was assessed using the Samilson-Prieto system in three operative studies; Konrads et al. did not perform systematic radiographic follow-up and reported the absence of symptomatic arthritis on clinical grounds only[18]. Banerjee et al. found no osteoarthritic changes at 41 months[1], and Marcheggiani Muccioli et al. demonstrated only grade I changes in 10 of 12 patients at a mean computed tomography (CT) follow-up of 66 months, with a mean allograft resorption rate of 4% ± 2.4[22]. In the conservative series, Festbaum et al. identified the adapted gamma angle and RHSL depth as the most relevant predictors of osteoarthritic progression at follow-up. RHSL depth decreased at final follow-up while lesion size and position remained unchanged[9].

Complications and reoperations

The complication profile was low across most operative series. AVN was exclusive to Park et al., occurring in two of four ORIF patients with Neer four-part fractures, and was attributed by the authors to fracture complexity and use of the deltopectoral approach in locked fracture-dislocations[29]. One screw migration was reported in Banerjee et al. and managed conservatively[1]. No neurological or vascular complications were described in any included study. The reoperation rate across the operative cohort was 3.8% (2/52); in the conservative series it was 31.0% (9/29) **(**Table 5**)**. Reoperation was used as the primary safety endpoint given the inconsistent reporting of individual complications across the included studies.

Predictors of outcome

Predictors of clinical and radiological outcomes were unevenly addressed across the included studies. Festbaum et al. provided the most extensive analysis, with five statistically significant correlations identified[9], although the authors themselves considered the study probably underpowered given the small sample. Park et al.[29], Banerjee et al.[1], Konrads et al.[18], and Marcheggiani Muccioli et al.[22] contributed descriptively or through algorithmic decision-making. Morán et al.[23] tested multiple variables without finding statistically significant associations, while Shen et al.[34] did not perform predictor analysis. The full synthesis is detailed in **Supplementary Table S4**.

Methodological quality and risk of bias assessment

The methodological quality scores of the included studies ranged from 8 to 13 out of 16. One study was classified as good (Konrads et al.[18] score 13; five as moderate (Marcheggiani Muccioli et al.[22] score 12; Banerjee et al.[1] and Park et al.[29] score 11; Morán et al.[23] score 10; Festbaum et al.[9] score 9), and one as low quality (Shen et al.[34] score 8). The most frequent limitations were retrospective data collection and the absence of a prospective sample size calculation, as expected in research on rare injuries. Detailed scores are presented in Table 4, with cell shading indicating individual item scores (green = 2, yellow = 1, red = 0) and the overall risk-of-bias judgment.

4. DISCUSSION

The main finding of this systematic review is that the current evidence on acute posterior shoulder instability, although limited to seven retrospective series, reports satisfactory outcomes with low rates of redislocation, avascular necrosis, and reoperation across both pure dislocations and fracture-dislocations when treatment is selected according to injury pattern. Based on this synthesis and on the authors' clinical reasoning, three variables were identified as candidates to guide management: time from injury to definitive treatment, the adapted gamma angle, and the reconstructibility of the humeral head. These variables form the basis of the treatment algorithm proposed in this review (Fig. 2).

The temporal window of intervention emerged as a recurring feature across the included series. Banerjee et al. operated on all seven patients within fourteen days of injury and reported no redislocation, no avascular necrosis, and no osteoarthritic progression at a median follow-up of forty-one months[1]. Konrads et al. applied the same 14-day threshold to select patients for joint-preserving surgery and obtained a Constant score of 92.5, with no symptomatic arthritis at 10 years.[18] Morán et al. operated on almost all their fracture-dislocations within the first days after injury, with no AVN and no instability recurrence in their cohort.[23]

These results cannot be directly compared with historical series of chronic locked dislocations, a different clinical entity in which allograft or osteochondral reconstruction has been associated with osteoarthritic change in nearly half of patients and revision rates above ten percent over time[8, 10]. However, this review included only acute lesions, and the relevance of early treatment can therefore not be derived from the present synthesis. It rests on the literature on chronic and neglected dislocations and on pathophysiological grounds: with time the humeral defect enlarges, cartilage deteriorates and soft tissues contract, narrowing the surgical repertoire toward arthroplasty. For this reason, the proposed algorithm frames decision-making within three weeks of injury, the threshold most used in the included studies, and applies a 14-day gate favouring joint-preserving options, derived from the series operating within this interval.

The adapted gamma angle deserves attention despite being evaluated in only one of the included studies. Originally derived from biomechanical work on bipolar defects by Moroder et al., it adds 2.3° per millimeter of posterior glenoid bone loss to the humeral gamma angle, integrating defect size, position and glenoid involvement into one number with a proposed threshold of 90°[24, 25]. Unlike the RHSL size expressed as a percentage of the humeral head, which quantifies the defect in isolation, the adapted gamma angle describes the same lesion in angular terms and accounts for its position and for glenoid-sided bone loss. In other words, both measurements describe the same defect from complementary perspectives. In the Festbaum cohort, every patient who failed conservative treatment or sustained a redislocation had an adapted gamma angle above 90°, while patients below this cut-off with a centered joint did well with non-operative management at mid- and long-term follow-up [9]. Moreover, the parameter correlated with osteoarthritic progression in that cohort[9].

In this sense, the adapted gamma angle may play a role similar to the glenoid track in anterior instability, where bipolar defects are read together rather than as isolated entities[12, 37]. Accordingly, it was

incorporated into the proposed algorithm as a modifier of treatment selection, pending validation in further cohorts, and not as a validated cut-off.

Currently, RHSL sized between 25 and 45 percent of the humeral head defines a range for which no single accepted treatment exists. Three operative strategies were represented in the included evidence, each with satisfactory mid-term outcomes. Banerjee et al. applied the modified McLaughlin transfer in a strictly acute cohort operated within fourteen days[1]. Konrads et al. tailored the technique to intraoperative cartilage status, choosing arthroscopic retrograde elevation when ICRS grading was preserved and iliac crest grafting when chondral damage was more advanced[18]. Marcheggiani Muccioli et al. reconstructed lesions that reached the upper end of the range using a fresh-frozen humeral head osteochondral allograft. No redislocation was observed across all three cohorts[22].

The three approaches differ in what they preserve. The modified McLaughlin transfer alters joint kinematics by relocating a tendon insertion into the articular surface, whereas disimpaction and osteochondral allograft aim to restore native anatomy. Rinaldi et al. recently compared the modified McLaughlin procedure and graft-based reconstruction in a systematic review and found no statistically significant difference in functional scores between techniques, which may support a decision framework based on lesion-specific modifiers rather than on a single preferred procedure[32]. The proposed algorithm (Fig. 2) integrates these variables, combining injury pattern, time from injury and adapted gamma angle as primary axes, with ICRS cartilage grade and glenoid integrity as intraoperative and radiological modifiers, extending the framework originally proposed by Paul et al.[30].

Fracture-dislocations require a separate decisional logic because the structural compromise extends beyond the RHSL to the humeral metaphysis. The included evidence supports a reconstructibility-based approach rather than a fracture-pattern-based one. Shen et al. and Morán et al. showed that two- and three-part patterns that operated within days of injury can be reduced and fixed with combined anchorage and locked plating, with union and no avascular necrosis at mid-term follow-up [23, 34]. Park et al. illustrated the upper limit of joint preservation, with Neer four-part fracture-dislocations showing avascular necrosis in half of the patients treated with open reduction and internal fixation [29].

The discriminating variable across these series was not the Neer count but whether the humeral head retained sufficient cortical contact and viability to allow stable osteosynthesis. When reconstructibility is compromised by extensive head fragmentation or questionable vascularity, arthroplasty may be the safer option, with the choice between hemiarthroplasty and reverse total shoulder arthroplasty depending on rotator cuff integrity, glenoid bone stock and articular integrity, patient age, and functional demands.

A common gap across the included evidence is the absence of arthroscopic techniques applied in the acute setting. All seven series relied on open exposure, with the partial exception of Konrads et al., who used arthroscopic assistance for retrograde elevation in selected cartilage-preserved cases[18]. Beyond this evidence base, Krackhardt et al. described the reverse remplissage, in which the subscapularis tendon is fixed into the reverse Hill-Sachs lesion through suture anchors, translating to the posterior side

the principle established by Wolf and colleagues for the anterior Hill-Sachs lesion[19, 31]. Subsequent refinements have combined reverse remplissage with arthroscopic posterior labral repair in selected cases. None of these strategies has been applied systematically within the three-week acute window, which represents the clearest direction for prospective research, particularly in lesions at the lower end of the contested range, where arthroscopic management may avoid the morbidity of open exposure[3, 13, 16, 21].

This review has several limitations. The included evidence consists of seven retrospective case series with small cohorts and heterogeneous outcome reporting; a pooled meta-analysis was therefore not possible. Combining pure posterior dislocations and posterior fracture-dislocations, although reflecting the shared direction of instability and the scarcity of the literature, introduces substantial clinical heterogeneity, as these entities differ in pathoanatomy, prognosis and treatment goals; the separate decision matrices of the proposed algorithm attempt to account for this, but the pooled description of the cohort should be interpreted with this caveat in mind. The adapted gamma angle was assessed in only one of the included studies, and its role in the algorithm is based on that single cohort and on the authors' interpretation of the biomechanical literature. The risk of bias was moderate in most studies according to the MINORS tool. Finally, the proposed algorithm has not been prospectively validated; it should be regarded as an expert-derived, hypothesis-generating framework to support clinical reasoning until higher-level evidence becomes available. Prospective evaluation, particularly of arthroscopic strategies within the acute window, remains the clearest direction for future research.

5. CONCLUSIONS

Evidence on the management of acute posterior glenohumeral instability consists of small retrospective series with heterogeneous injury patterns and treatment strategies. Both joint-preserving techniques and arthroplasty yielded satisfactory functional outcomes in selected patients. On this basis, combined with the clinical reasoning of the authors, a treatment algorithm integrating time from injury, adapted gamma angle and humeral head reconstructibility is proposed. The algorithm has not been validated and should be regarded as a hypothesis to be tested in prospective studies.

Declarations

Author Contribution

EB, AH and FM conceived the study and provided senior supervision and critical revision of the manuscript for important intellectual content. JMH designed the study, performed the literature search, screening, and data extraction together with LVF, analysed and interpreted the data, and prepared the tables and figures. JMH and TMF developed and drafted the manuscript. LVF acted as the second reviewer for screening and data extraction. All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

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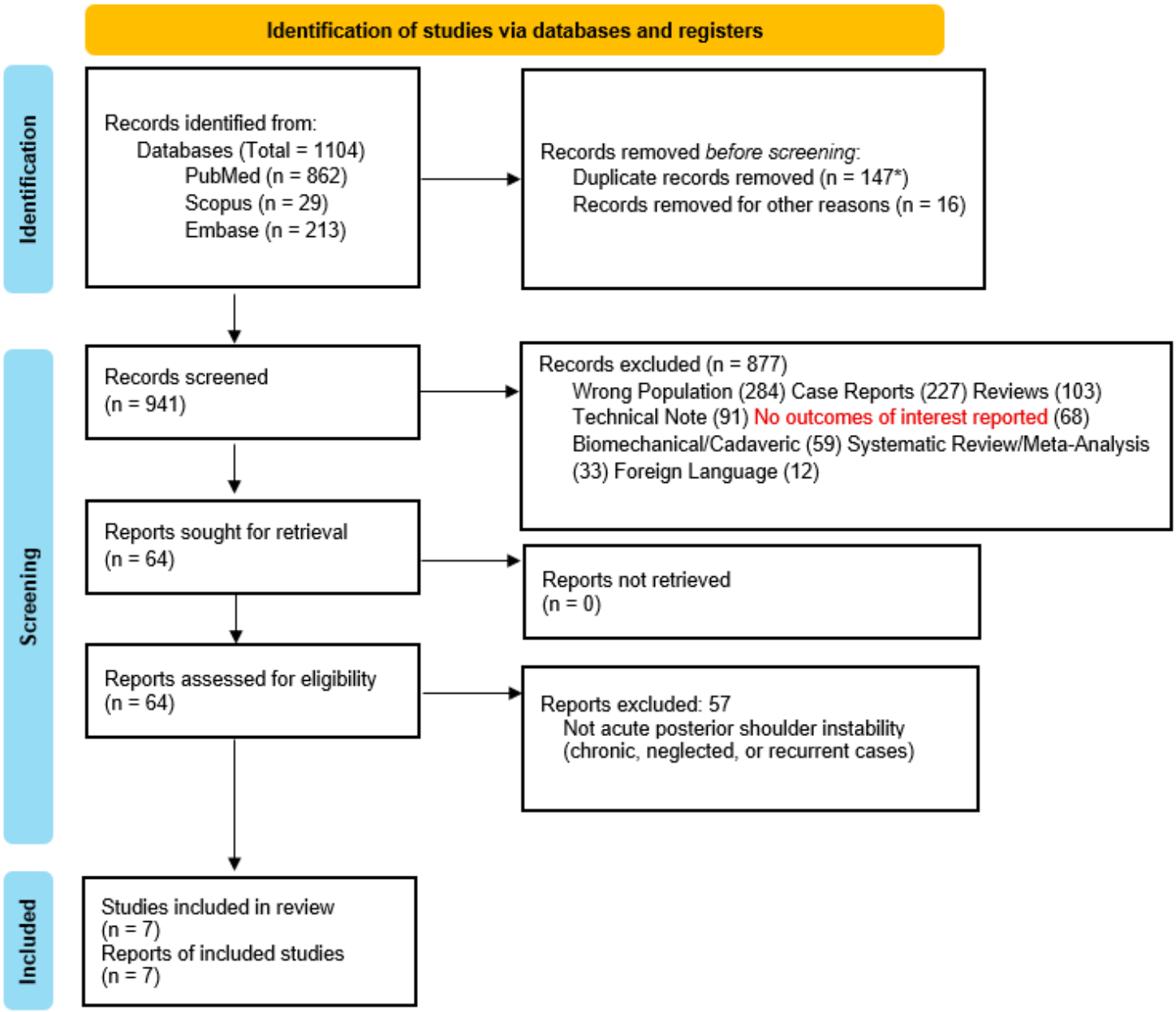
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Tables

Tables 1 to 5 are available in the Supplementary Files section.

Figures



* Automation tools identified 288 potential duplicates; after manual verification, 147 were confirmed and removed.

Figure 1

PRISMA 2020 flow diagram showing study identification, screening, eligibility and inclusion.

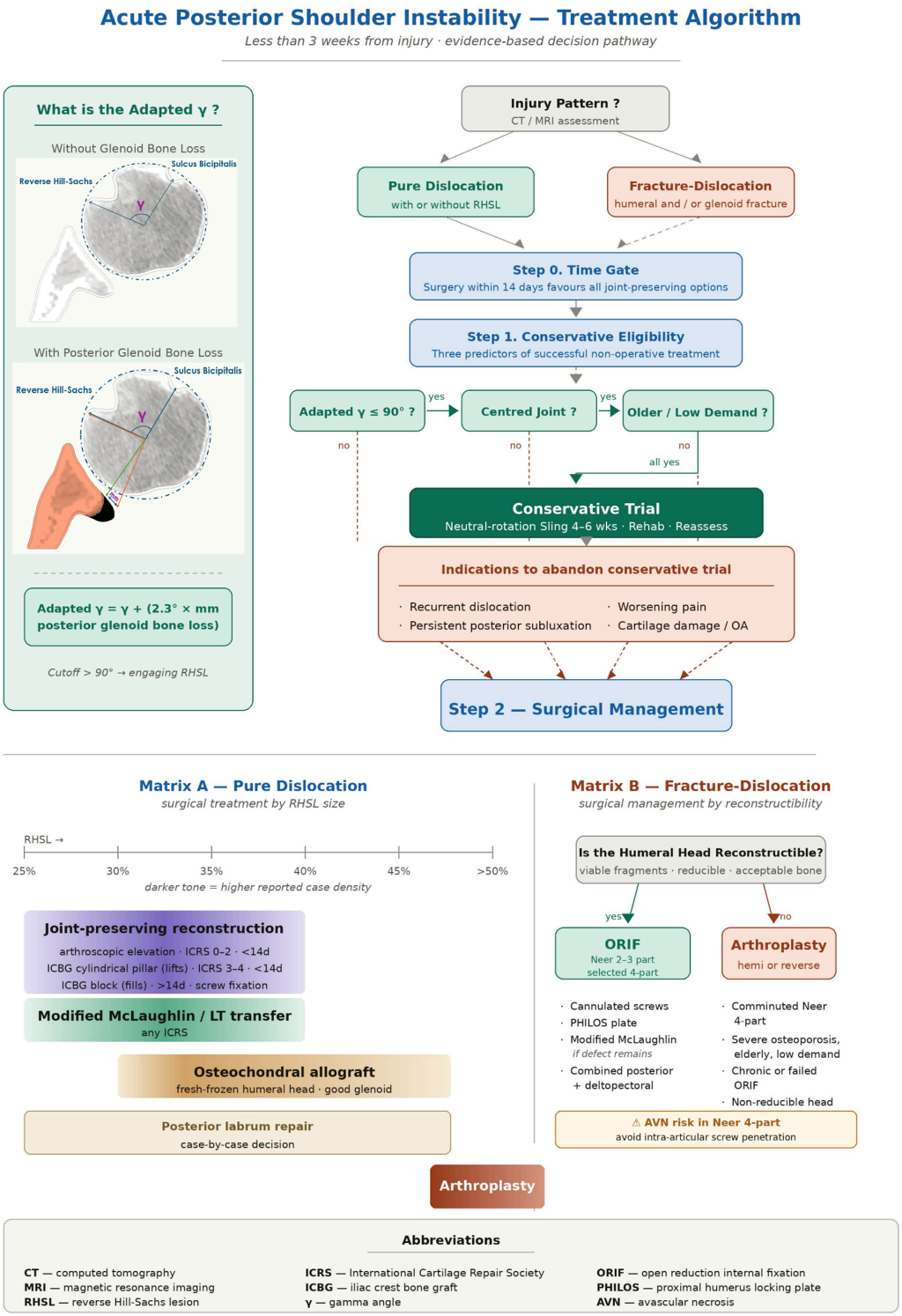


Figure 2

Proposed treatment algorithm for acute posterior shoulder instability. The upper pathway distinguishes pure dislocation from fracture-dislocation and applies a 14-day time gate together with the three Festbaum predictors (adapted gamma angle ≤ 90°, centred glenohumeral joint, older or low-demand patient). The lateral panel illustrates the adapted gamma angle, defined as the gamma angle plus 2.3° per millimetre of posterior glenoid bone loss ([9, 25, 26]. Matrix A covers pure dislocations with reverse

Hill-Sachs lesion in the 25–50 percent range, with three overlapping options modulated by ICRS cartilage grade and glenoid integrity. Matrix B covers fracture-dislocations, gated by humeral head reconstructibility, separating ORIF from arthroplasty

ICRS, International Cartilage Repair Society; ORIF, open reduction and internal fixation; RHSL, reverse Hill-Sachs lesion.

Supplementary Files

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