

Distal Humerus Fracture

Overview

- Reported outcomes for acute distal humerus fractures remain inconsistent across the orthopedic literature, making it difficult for surgeons to retrospectively compare surgical techniques and clinical outcomes across studies [3].
- The systematic review cited is the largest report of complications and reoperations of intra-articular distal humeral fractures after ORIF in the current literature [9].
- Decision regarding the treatment for intra-articular fractures of the distal humerus should be based on a combination of the best available evidence and preference of the surgeon [7].
- Open reduction and internal fixation is a viable treatment option for distal humeral fractures in the elderly, but careful patient selection is required [14].
- Older patients who underwent ORIF of the distal humerus using a parallel construct demonstrated good functional outcomes and similar complications to those in previously reported studies [1].
- For comminuted distal humerus fractures in young patients, ORIF appears to be the preferred surgical option, offering superior functional outcomes and a lower incidence of complications and heterotopic ossification [20].
- Total elbow arthroplasty provides a successful treatment alternative for selected distal humerus fractures, particularly in elderly patients with low anticipated physical demands, severe osteopenia, or comminution [22].
- Distal humerus hemiarthroplasty is a viable option in the treatment of unreconstructible distal humerus fractures, with good to excellent outcomes expected [2].
- Distal humeral hemiarthroplasty is a suitable option for unreconstructable distal humeral fractures and offers good functional outcomes with acceptable complication rates [8].
- Elbow hemiarthroplasty is a viable option for complex distal humeral fractures in select patients, offering functional outcomes comparable to total elbow arthroplasty while potentially avoiding complications related to the ulnar component [15].
- Open reduction and internal fixation with bone grafting is the treatment of choice for nonunion of distal humerus fractures if no excessive damage of the articular surface is present [5].

Anatomy & Pathophysiology

- Malunion of distal humerus fractures is a common complication influenced by biology, reduction quality, fixation methods, and mechanical failure [6].
- Posterior shear fractures of the distal humerus mostly involve the posterior aspect of the capitellum and are often associated with elbow dislocation [29].
- Precontoured locking plates may have geometric limitations in specific complex morphologies of coronal shear fractures, supporting individualized hybrid fixation strategies [27].
- Anatomic reduction with sufficient stability to allow for early joint mobilization is a general principle for the treatment of coronal shear fractures involving the capitellum and trochlea [35].
- Management principles for pediatric distal humerus fractures focus on restoring the anatomic axis, the triangle of stability, and the articular surface to ensure a stable elbow joint that allows for early motion and full range of motion [4].
- There is a lack of consensus on defining and diagnosing different types of ulnar nerve dysfunction in distal humerus fractures [31].

Classification

- The Dubberley classification is useful in describing coronal shear fractures of the distal humerus and selecting the surgical approach [30].
- Outcomes for capitellum fractures are unclear due to multiple classification systems and a literature consisting of small case series without comparative groups [34].

Clinical Presentation

- Older adults with isolated distal humerus fractures have substantial mortality at 1 and 2 years, which is strongly predicted by comorbidity burden and preinjury ambulation [17].
- Malunion is a common complication after distal humerus fractures, influenced by biology, reduction, fixation methods, and mechanical failure [6].
- The management of distal humerus fractures remains problematic, particularly in elderly patients with osteoporosis and comminution where ORIF may be impossible [18].

Investigations

- A thorough smoking history and CT Hounsfield Unit measurements in the coronal plane may identify patients with poorer bone quality at higher risk for postoperative mechanical complications following distal humerus fracture fixation [21].

Treatment

- Open reduction and internal fixation (ORIF) using parallel precontoured plates demonstrates good functional outcomes and complication rates similar to previously reported studies in elderly patients [1].
- Distal humerus hemiarthroplasty is a viable treatment option for unreconstructible distal humerus fractures, with good to excellent outcomes expected [2].
- Reported outcomes for acute distal humerus fractures remain inconsistent across the orthopedic literature, complicating retrospective comparisons of surgical techniques and clinical outcomes [3].
- Decision-making regarding the treatment for intra-articular fractures of the distal humerus should be based on a combination of the best available evidence and surgeon preference [7].
- Distal humeral hemiarthroplasty is a suitable option for unreconstructable distal humeral fractures, offering good functional outcomes with acceptable complication rates [8].
- A systematic review provides the largest report of complications and reoperations of intra-articular distal humeral fractures after ORIF in the current literature [9].
- Complete distal humerus fractures are treated using a posterior approach with dual plating, while elbow arthroplasty may be indicated for selected patients with severely comminuted fractures and osteoporotic bone [10].
- Distal humerus hemiarthroplasty yields satisfactory functional outcomes and range of motion in complex distal humerus fractures not amenable to fixation, particularly in elderly patients [11].
- Both orthogonal and parallel plating techniques can be used to treat distal humerus fractures with excellent outcomes [12].
- Salvage total elbow arthroplasty (TEA) is a viable option for managing post-traumatic sequelae following distal humeral fracture treatment, but patients undergoing salvage TEA have a significantly increased rate of complications and significantly inferior functional outcomes compared to those undergoing acute TEA [13].
- Open reduction and internal fixation is a viable treatment option for distal humeral fractures in the elderly, requiring careful patient selection [14].
- Internal fixation is generally accepted as the standard of care for intra-articular distal humerus fractures, with rigid anatomic fixation combined with early motion associated with favorable results [16].
- Management of distal humeral fractures remains problematic in elderly patients with osteoporosis and comminution where ORIF may be impossible [18].
- Orthopedic (OO), triceps-reflecting anconeus (TRA), triceps-splitting (TS), and triceps-turning (TT) posterior approaches provide comparable overall clinical outcomes in the management of AO/OTA type C complete intra-articular distal humerus fractures, with most outcome measures showing no statistically significant differences [19].
- Total elbow arthroplasty constitutes a viable treatment option for complex distal humeral fractures in elderly and medically compromised patients [38].

Complications

- Older patients undergoing ORIF of the distal humerus using a parallel construct demonstrate good functional outcomes and similar complication rates to those in previously reported studies [1].
- Distal humerus hemiarthroplasty is a viable option for unreconstructible distal humerus fractures, with good to excellent outcomes expected [2].
- Management principles for unusual pediatric distal humerus fracture patterns focus on restoring the anatomic axis, the triangle of stability, and the articular surface to ensure a stable elbow joint that allows for early motion and full range of motion [4].
- This systematic review represents the largest report of complications and reoperations of intra-articular distal humeral fractures after ORIF in the current literature [9].
- Salvage total elbow arthroplasty (TEA) is a viable option for managing post-traumatic sequelae following distal humeral fracture treatment, although patients undergoing salvage TEA have a significantly increased rate of complications and significantly inferior functional outcomes compared with those who undergo acute TEA [13].
- In older adults with isolated distal humerus fractures, mortality at 1 and 2 years is substantial and strongly predicted by comorbidity burden and preinjury ambulation [17].
- A thorough smoking history and CT Hounsfield Unit (HU) measurements in the coronal plane may identify patients with poorer bone quality at higher risk for postoperative mechanical complications following distal humerus fracture fixation [21].
- The high risk of complications in olecranon osteotomy must be considered in the decision to perform this procedure in the treatment of distal humerus fractures [39].

Recovery

- Older patients undergoing open reduction and internal fixation (ORIF) of the distal humerus using a parallel precontoured plate construct demonstrate good functional outcomes [1].
- Complication rates for elderly patients treated with parallel plate ORIF are similar to those reported in previously published studies [1].
- Distal humerus hemiarthroplasty is a viable treatment option for unreconstructible distal humerus fractures [2].
- Patients treated with distal humerus hemiarthroplasty for trauma can expect good to excellent outcomes [2].
- Reported outcomes for acute distal humerus fractures are inconsistent across the orthopedic literature [3].
- Outcome inconsistency in the literature hinders retrospective comparison of surgical techniques and clinical outcomes across studies [3].
- Management of pediatric distal humerus fractures focuses on restoring the anatomic axis, the triangle of stability, and the articular surface [4].

- Restoration of anatomic alignment and stability in pediatric distal humerus fractures is intended to ensure a stable elbow joint that allows for early motion and full range of motion [4].
- Malunion is a common complication following distal humerus fractures [6].
- Malunion risk is influenced by biology, reduction quality, fixation methods, and mechanical failure [6].
- Distal humeral hemiarthroplasty is a suitable option for unreconstructable distal humeral fractures [8].
- Distal humeral hemiarthroplasty offers good functional outcomes with acceptable complication rates [8].
- Distal humerus hemiarthroplasty yields satisfactory functional outcomes and range of motion in complex distal humerus fractures not amenable to fixation [11].
- Distal humerus hemiarthroplasty is particularly effective for complex fractures in elderly patients [11].
- Salvage total elbow arthroplasty (TEA) is a viable option for managing post-traumatic sequelae of distal humeral fractures [13].
- Patients undergoing salvage TEA have a significantly increased rate of complications compared to those undergoing acute TEA [13].
- Patients undergoing salvage TEA have significantly inferior functional outcomes compared to those undergoing acute TEA [13].
- Elbow hemiarthroplasty is a viable option for complex distal humeral fractures in select patients [15].
- Elbow hemiarthroplasty provides functional outcomes comparable to total elbow arthroplasty [15].
- Elbow hemiarthroplasty may avoid complications related to the ulnar component compared to total elbow arthroplasty [15].
- Mortality at 1 and 2 years is substantial in older adults with isolated distal humerus fractures [17].
- Mortality in older adults with isolated distal humerus fractures is strongly predicted by comorbidity burden and preinjury ambulation [17].
- Smoking history and CT Hounsfield Unit (HU) measurements in the coronal plane can identify patients with poorer bone quality [21].
- Patients identified with poorer bone quality via smoking history and CT HU measurements are at higher risk for postoperative mechanical complications following distal humerus fracture fixation [21].
- In older cohorts, intra-articular distal humerus fractures are associated with a more than two-fold increased risk of progressing to TEA compared to extra-articular fractures [41].
- The increased risk of TEA for intra-articular versus extra-articular fractures in older patients is observed at every time point studied [41].
- Nearly 5.5% of older patients with distal humerus fractures progress to TEA by 10 years [41].
- Long-term results of well-performed ORIF demonstrate satisfactory outcomes in most patients with bicondylar distal humerus fractures [42].
- TEA yields encouraging results as a primary treatment for carefully selected comminuted distal humerus fractures in elderly patients [43].
- TEA is particularly indicated for elderly patients with comminuted distal humerus fractures who also have significant rheumatoid arthritic changes [43].

Key Evidence

- [L4] Older patients who underwent ORIF of the distal humerus using a parallel construct demonstrated good functional outcomes and similar complications to those in previously reported studies. [1] ([10.1016/j.jhsa.2022.01.030](#))
- [L4] Distal humerus hemiarthroplasty is a viable option in the treatment of unreconstructible distal humerus fractures, with good to excellent outcomes expected. [2] ([10.1016/j.jse.2022.02.015](#))
- [L1] Reported outcomes for acute distal humerus fractures remain inconsistent across the orthopedic literature, making it difficult for surgeons to retrospectively compare surgical techniques and clinical outcomes across studies. [3] ([10.1016/j.otsr.2018.08.017](#))
- [L5] Management principles focus on restoring the anatomic axis, the triangle of stability, and the articular surface to ensure a stable elbow joint that allows for early motion and full range of motion. [4] ([10.5435/jaaos-d-17-00326](#))
- [L5] Open reduction and internal fixation with bone grafting is the treatment of choice for nonunion of distal humerus fractures if no excessive damage of the articular surface is present. [5] ([10.1016/j.jisako.2024.07.002](#))
- [L5] Malunion is a common complication after distal humerus fractures influenced by biology, reduction, fixation methods, and mechanical failure. [6] ([10.1016/j.jisako.2024.05.009](#))
- [L5] Decision regarding the treatment for intra-articular fractures of the distal humerus should be based on a combination of the best available evidence and preference of the surgeon. [7] ([10.5397/cise.2019.22.2.113](#))
- [L4] Distal humeral hemiarthroplasty is a suitable option for unreconstructable distal humeral fractures and offers good functional outcomes with acceptable complication rates. [8] ([10.1177/17585732211023100](#))
- [L1] This systematic review is the largest report of complications and reoperations of intra-articular distal humeral fractures after ORIF in the current literature. [9] ([10.1016/j.jse.2021.02.017](#))
- [L4] Complete fractures are treated using a posterior approach with dual plating, while elbow arthroplasty may be indicated for selected patients with severely comminuted fractures and osteoporotic bone. [10] ([10.1016/j.otsr.2013.11.002](#))
- [L1] DHH yields satisfactory functional outcomes and range of motion in complex distal humerus fractures not amenable to fixation, particularly in elderly patients. [11] ([10.1016/j.jseint.2026.101695](#))
- [L5] Distal humerus fractures are complex, and both orthogonal and parallel plating techniques can be used to treat these difficult fractures with excellent outcomes. [12] ([10.1016/j.hcl.2010.05.008](#))
- [L1] Salvage TEA represents a viable option for the management of post-traumatic sequelae following the treatment of a distal humeral fracture, although patients who underwent salvage TEA had a significantly increased rate of complications and significantly inferior functional outcomes compared with those who underwent TEA acutely. [13] ([10.1302/0301-620x.108b1.bjj-2025-0475.r1](#))
- [Paper] Open reduction and internal fixation is a viable treatment option for distal humeral fractures in the elderly, but careful patient selection is required. [14] ([10.1016/j.injury.2007.08.006](#))

- [L4] Elbow hemiarthroplasty is a viable option for complex distal humeral fractures in select patients, offering functional outcomes comparable to total elbow arthroplasty while potentially avoiding complications related to the ulnar component. [15] ([10.1177/1758573216640210](#))
- [L5] Internal fixation is generally accepted as the standard of care for the treatment of intra-articular distal humerus fractures, with rigid anatomic fixation combined with early motion associated with favorable results. [16] ([10.1016/j.hcl.2007.09.001](#))
- [L3] In older adults with isolated distal humerus fractures, mortality at 1 and 2 years is substantial and strongly predicted by comorbidity burden and preinjury ambulation. [17] ([10.1016/j.jse.2026.02.013](#))
- [L5] The management of distal humeral fractures remains problematic, particularly in elderly patients with osteoporosis and comminution where ORIF may be impossible. [18] ([10.1016/j.jse.2010.11.012](#))
- [L1] Current evidence indicates that OO, TRA, TS, and TT posterior approaches provide comparable overall clinical outcomes in the management of AO/OTA type C complete intra-articular distal humerus fractures, with most outcome measures showing no statistically significant differences. [19] ([10.1186/s13018-026-06739-x](#))
- [L4] For comminuted distal humerus fractures in young patients, ORIF appears to be the preferred surgical option, offering superior functional outcomes and a lower incidence of complications and heterotopic ossification. [20] ([10.1016/j.xrrt.2025.07.014](#))
- [L3] A thorough smoking history and CT HU measurements in the coronal plane may identify patients with poorer bone quality at higher risk for postoperative mechanical complications following distal humerus fracture fixation. [21] ([10.5435/jaaos-d-26-00191](#))
- [L4] Total elbow arthroplasty provides a successful treatment alternative for selected distal humerus fractures, particularly in elderly patients with low anticipated physical demands, severe osteopenia, or comminution. [22] ([10.1016/j.hcl.2015.06.008](#))
- [L4] Precontoured locking plates may have geometric limitations in specific complex morphologies, supporting individualized hybrid fixation strategies. [27] ([10.1186/s12891-026-09582-7](#))
- [L4] Posterior shear fractures of the distal humerus mostly involve the posterior of the capitellum and are often associated with elbow dislocation. [29] ([10.1016/j.jse.2026.05.003](#))
- [L4] The study confirms the utility of the Dubberley classification in describing the fracture and selecting the surgical approach. [30] ([10.1016/j.jse.2025.05.033](#))
- [L5] There is a lack of consensus on defining and diagnosing different types of ulnar nerve dysfunction, necessitating prospective studies with standardized definitions. [31] ([10.1016/j.jhsa.2011.11.023](#))
- [L4] The article summarizes the existing body of evidence on capitellum fractures, noting that outcomes are unclear due to multiple classification systems and a literature consisting of small case series without comparative groups, and proposes areas for future study. [34] ([10.1177/1558944719878817](#))
- [L4] Anatomic reduction with sufficient stability to allow for early joint mobilization is a general principal for treatment. [35] ([10.1016/j.hcl.2004.08.001](#))
- [L4] Total elbow arthroplasty constitutes a viable treatment option for complex distal humeral fractures in elderly and medically compromised patients. [38] ([10.1016/j.injury.2009.01.123](#))

- [L2] The high risk of complications in olecranon osteotomy must be considered in the decision to perform this procedure in the treatment of distal humerus fractures. [39] ([10.5397/cise.2021.00591](https://doi.org/10.5397/cise.2021.00591))
- [L4] In the older cohort, intra-articular fractures were consistently and temporally associated with a more than two-fold increased risk of TEA compared with extra-articular fractures at every time point studied, with nearly 5.5% of patients progressing to TEA by 10 years. [41] ([10.1177/17585732261451863](https://doi.org/10.1177/17585732261451863))
- [L5] Long-term results of well-performed open reduction and internal fixation demonstrate satisfactory outcomes in most patients. [42] ([10.5435/00124635-201001000-00004](https://doi.org/10.5435/00124635-201001000-00004))
- [L4] Encouraging results have been reported using TEA as a primary mode of treatment for carefully selected comminuted distal humerus fractures in elderly patients, particularly if the patient also has significant rheumatoid arthritic changes. [43] ([10.1016/j.hcl.2004.06.006](https://doi.org/10.1016/j.hcl.2004.06.006))

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