

Stiff Elbow Release (Arthrolysis)

Overview

- Treatment choices for elbow stiffness must consider non-surgical management and various surgical options including arthroscopic or open capsular release, arthroplasty, and elbow replacement [1].
- Arthroscopic elbow contracture release can improve function and range of motion, although outcomes may vary based on preoperative patient characteristics [2].
- Current literature provides state-of-the-art guidance on the prevention, evaluation, and treatment of elbow stiffness [3].
- Patients with stiff elbows who underwent arthroscopic arthrolysis achieved satisfactory clinical outcomes very early postoperatively [4].
- In the setting of failed nonsurgical treatment of the stiff elbow, surgical release can yield sustained improvement of range of motion and patient quality of life [5].
- Arthroscopic capsular release of the elbow is effective for restoring a functional arc of motion in the short term in most patients with extrinsic contractures [6].
- A multinational initiative provides the first comprehensive clinical practice guideline for open arthrolysis in adult posttraumatic elbow stiffness [7].
- Current treatment options for post-traumatic elbow stiffness range from conservative to surgical, with varying rates of success, invasiveness, and complications [11].
- A subset of pediatric patients with persistent stiffness following medial epicondyle fractures may benefit from additional interventions, including intensive therapy, transposition of the ulnar nerve, and open capsular release [12].
- The use of a hinged external fixator in open arthrolysis for posttraumatic elbow stiffness may result in short-term improvements in flexion-extension range of motion but is accompanied by increased blood loss, longer operative time, extended hospitalization, and higher costs [13].
- Although both open and arthroscopic techniques may produce satisfactory results, the current use of arthroscopy by experienced surgeons will produce results superior to those of open release given the proper indications [15].
- The dual mediolateral mini-open technique allows for a safe and effective release of stiff elbows through small incisions of 3–5 cm in length [17].

Anatomy & Pathophysiology

- Elbow stiffness involves arthritis and heterotopic ossification [1].
- Successful intervention for stiff elbow depends on the quality of the joint and the extent of soft tissue damage [9].
- Treatment of the stiff elbow requires a thorough understanding of normal anatomy and etiological factors to develop effective strategies [16].
- Endoscopic anterior capsulectomy is technically difficult and requires familiarity with neurovascular and musculoligamentous elbow anatomy [22].
- Orthogonal plate configuration, olecranon osteotomy, and longer operative time are associated with increased odds of dysfunctional elbow stiffness following operative fixation of distal humerus fractures [24].
- Progression of elbow flexion contracture in obstetric brachial plexus injury appears to level off after the age of 10 to 12 years, likely ending at skeletal maturity [29].

Classification

- Management of the stiff elbow involves prevention, evaluation, and treatment strategies [3].
- In the setting of failed nonsurgical treatment of the stiff elbow, surgical release can yield sustained improvement of ROM and patient quality of life [5].
- Clinical practice guidelines exist for open arthrolysis in adult posttraumatic elbow stiffness [7].
- Functional improvements in elbow stiffness can be achieved with both nonsurgical and surgical strategies [8].
- The functional arc of motion serves as a frame of reference rather than an absolute goal in stiff elbow intervention [9].
- Both open and arthroscopic techniques may produce satisfactory results for post-traumatic stiff elbow, with arthroscopy potentially producing superior results in most cases when performed by experienced surgeons with proper indications [15].
- Operative management of pediatric elbow contractures is effective [18].

Clinical Presentation

- Elbow stiffness is a challenging problem with no ideal management solution [8].
- Elbow contracture is challenging to treat, making prevention of paramount importance [14].
- Elbow stiffness can be caused by arthritis and heterotopic ossification [1].
- The functional arc of motion serves as a frame of reference rather than an absolute goal for stiff elbow intervention [9].

- Although both open and arthroscopic techniques may produce satisfactory results, arthroscopy by experienced surgeons may produce results superior to those of open release given proper indications [15].
- Overall, patients maintained substantial reductions in pain, improvement in elbow range of motion, and increased overall elbow function after operative management of elbow stiffness secondary to heterotopic ossification [10].
- This treatment approach for bony encasement of the ulnar nerve secondary to heterotopic ossification leads to superior range of motion, improved or resolved ulnar neuropathy, and good to excellent long-term functional outcomes [19].
- The authors describe a case of delayed-onset anterior interosseous nerve palsy developing one week after open elbow contracture release, likely due to a stretch injury [21].

Investigations

- Management of the stiff elbow involves evaluation, prevention, and treatment strategies [3].
- Patients maintained substantial reductions in pain, improvement in elbow range of motion, and increased overall elbow function after operative management of elbow stiffness secondary to heterotopic ossification [10].
- Prevention of elbow contracture is of paramount importance as it is challenging to treat [14].
- Arthroscopy by experienced surgeons may produce results superior to those of open release given the proper indications [15].
- Treatment for bony encasement of the ulnar nerve secondary to heterotopic ossification leads to superior range of motion, improved or resolved ulnar neuropathy, and good to excellent long-term functional outcomes [19].
- Delayed-onset anterior interosseous nerve palsy can develop one week after open elbow contracture release, likely due to a stretch injury [21].
- Excision and reconstruction of the ligament with heterotopic ossification can be a viable and reliable solution for elbow joint stiffness, particularly when wide heterotopic ossification involves collateral ligaments [34].

Treatment

- State-of-the-art guidance exists on the management regarding prevention, evaluation, and treatment of elbow stiffness [3].
- Additional peripheral nerve block combined with a postoperative nerve block catheter in arthroscopic arthrolisis in cases of elbow stiffness may enhance postoperative outcomes by achieving better functional range of motion, perhaps through reduced postoperative pain [30].

Complications

- Arthritis and heterotopic ossification are complications associated with elbow stiffness [1].
- Surgical release for failed nonsurgical treatment of stiff elbow can yield sustained improvement of range of motion and patient quality of life [5].
- Current treatment options for post-traumatic elbow stiffness have varying rates of complications [11].
- The use of a hinged external fixator in open arthrolysis for posttraumatic elbow stiffness is accompanied by increased blood loss, longer operative time, extended hospitalization, and higher costs [13].

Recovery

- Surgical release can yield sustained improvement of range of motion and patient quality of life in the setting of failed nonsurgical treatment of the stiff elbow [5].
- Treatment approaches for bony encasement of the ulnar nerve secondary to heterotopic ossification lead to superior range of motion, improved or resolved ulnar neuropathy, and good to excellent long-term functional outcomes [19].
- Patients who underwent early excision of heterotopic ossification had better restoration of elbow range of motion compared to delayed excision, with no significant differences in recurrence rates between the two groups [35].

Key Evidence

- [L5] Treatment choices must consider non-surgical management and various surgical options including arthroscopic or open capsular release, arthroplasty, and elbow replacement. [1] ([10.1016/j.jisako.2023.10.009](#))
- [L4] Arthroscopic elbow contracture release can improve function and range of motion; however, outcomes may vary based on preoperative patient characteristics. [2] ([10.1016/j.jseint.2026.101621](#))
- [L4] This paper reviews the current literature and provides state-of-the-art guidance on the management regarding prevention, evaluation, and treatment of elbow stiffness. [3] ([10.1530/eor-23-0039](#))
- [L1] Patients with stiff elbows who underwent arthroscopic arthrolysis achieved satisfactory clinical outcomes very early postoperatively. [4] ([10.1016/j.jse.2024.06.009](#))
- [L5] In the setting of failed nonsurgical treatment of the stiff elbow, surgical release can yield sustained improvement of ROM and patient quality of life. [5] ([10.5435/jaaos-d-14-00051](#))
- [L5] Arthroscopic capsular release of the elbow is effective for restoring a functional arc of motion in the short term in most patients with extrinsic contractures. [6] ([10.5435/00124635-201105000-00004](#))
- [L5] This multinational initiative provides the first comprehensive clinical practice guideline for open arthrolysis in adult posttraumatic elbow stiffness. [7] ([10.1016/j.jse.2025.07.015](#))

- [L4] Elbow stiffness is a challenging problem with no ideal management solution; however, functional improvements can be achieved with both nonsurgical and surgical strategies, and recent advancements in biology and pathology may lead to future breakthroughs in prevention and treatment. [8] ([10.1016/j.jhsa.2013.06.007](#))
- [L5] Successful intervention for stiff elbow depends on the quality of the joint and the extent of soft tissue damage, with the functional arc of motion serving as a frame of reference rather than an absolute goal. [9] ([10.1016/j.jisako.2023.09.002](#))
- [L4] Overall, patients maintained substantial reductions in pain, improvement in elbow range of motion, and increased overall elbow function. [10] ([10.1016/j.jse.2024.11.019](#))
- [L5] Current treatment options for post-traumatic elbow stiffness range from conservative to surgical, with varying rates of success, invasiveness, and complications. [11] ([10.1177/1758573218793903](#))
- [L4] A subset of pediatric patients with persistent stiffness following medial epicondyle fractures may benefit from additional interventions, including intensive therapy, transposition of the ulnar nerve, and open capsular release. [12] ([10.1016/j.jhsg.2023.07.002](#))
- [L3] The use of a hinged external fixator in open arthrolysis for posttraumatic elbow stiffness may result in short-term improvements in flexion-extension range of motion but is accompanied by increased blood loss, longer operative time, extended hospitalization, and higher costs. [13] ([10.1186/s12891-024-08167-6](#))
- [L5] Elbow contracture is challenging to treat, and therefore prevention is of paramount importance. [14] ([10.1016/j.jhsa.2009.02.020](#))
- [L5] Although both open and arthroscopic techniques may produce satisfactory results, the authors believe that in most cases the current use of arthroscopy by experienced surgeons will produce results superior to those of open release given the proper indications. [15] ([10.1016/j.jse.2010.11.029](#))
- [L5] Treatment of the stiff elbow requires a thorough understanding of normal anatomy and etiological factors to develop effective strategies. [16] ([10.1016/j.jisako.2023.10.006](#))
- [L4] The dual mediolateral mini-open technique allows for a safe and effective release of stiff elbows through small incisions of 3–5 cm in length. [17] ([10.1186/s13018-025-06288-9](#))
- [L1] Operative management of pediatric elbow contractures is effective. [18] ([10.1016/j.jhsa.2024.01.010](#))
- [L4] This treatment approach leads to superior range of motion, improved or resolved ulnar neuropathy, and good to excellent long-term functional outcomes. [19] ([10.1016/j.jse.2023.12.003](#))
- [Case_report] The authors describe a case of delayed-onset anterior interosseous nerve palsy developing one week after open elbow contracture release, likely due to a stretch injury. [21] ([10.5397/cise.2022.00899](#))
- [L5] The procedure is technically difficult and should be performed by experienced surgeons who are familiar with the neurovascular and musculoligamentous elbow anatomy. [22] ([10.1016/j.jisako.2024.02.003](#))
- [L3] Orthogonal plate configuration, olecranon osteotomy, and longer operative time were associated with increased odds of dysfunctional elbow stiffness. [24] ([10.1016/j.jse.2024.06.010](#))
- [L4] Progression of elbow flexion contracture appears to level off after the age of 10 to 12 years, likely ending at skeletal maturity. [29] ([10.1177/17531934231178121](#))

- [L3] Additional peripheral nerve block combined with a postoperative nerve block catheter in arthroscopic arthrolysis in cases of elbow stiffness may be an opportunity to enhance postoperative outcomes by achieving better functional ROM, perhaps through reduced postoperative pain. [30] ([10.1016/j.jseint.2024.10.009](#))
- [L4] Excision and reconstruction of the ligament with heterotopic ossification can be a viable and reliable solution for elbow joint stiffness, particularly when wide HO involves collateral ligaments. [34] ([10.1016/j.jseint.2025.101418](#))
- [L4] Patients who underwent early excision had better restoration of elbow ROM compared to delayed excision, with no significant differences in recurrence rates between the two groups. [35] ([10.3390/life13122358](#))

References

- [1] Elbow stiffness: Arthritis and heterotopic ossification. *Journal of ISAKOS*. 2024. DOI: 10.1016/j.jisako.2023.10.009
- [2] Preoperative risk factors associated with patient outcomes following arthroscopic elbow contracture release. *JSES International*. 2026. DOI: 10.1016/j.jseint.2026.101621
- [3] Management of the stiff elbow: a literature review. *EFORT Open Reviews*. 2023. DOI: 10.1530/eor-23-0039
- [4] Does tranexamic acid reduce elbow swelling and improve early function following arthroscopic arthrolysis? A double-blind randomized controlled trial. *Journal of Shoulder and Elbow Surgery*. 2024. DOI: 10.1016/j.jse.2024.06.009
- [5] Open Surgical Release for Contractures of the Elbow. *Journal of the American Academy of Orthopaedic Surgeons*. 2015. DOI: 10.5435/jaaos-d-14-00051
- [6] Arthroscopic Management of the Stiff Elbow. *American Academy of Orthopaedic Surgeon*. 2011. DOI: 10.5435/00124635-201105000-00004
- [7] Clinical guideline on the open arthrolysis for post-traumatic elbow stiffness in adult patients. *Journal of Shoulder and Elbow Surgery*. 2026. DOI: 10.1016/j.jse.2025.07.015
- [8] Prevention and Treatment of Elbow Stiffness: A 5-Year Update. *The Journal of Hand Surgery*. 2013. DOI: 10.1016/j.jhsa.2013.06.007
- [9] Elbow stiffness: Interview with professor Bernard Morrey. *Journal of ISAKOS*. 2024. DOI: 10.1016/j.jisako.2023.09.002
- [10] Assessing long-term outcomes after operative management of elbow stiffness secondary to heterotopic ossification. *Journal of Shoulder and Elbow Surgery*. 2025. DOI: 10.1016/j.jse.2024.11.019
- [11] Post-traumatic elbow stiffness: Pathogenesis and current treatments. *Shoulder & Elbow*. 2018. DOI: 10.1177/1758573218793903

- [12] Outcomes of Therapy and Ulnar Nerve Transposition for Elbow Stiffness After Pediatric Medial Epicondyle Fractures. *Journal of Hand Surgery Global Online*. 2023. DOI: 10.1016/j.jhsg.2023.07.002
- [13] Comparative study of open elbow arthrolysis with and without hinge external fixation for the treatment of post-traumatic elbow stiffness. *BMC Musculoskeletal Disorders*. 2024. DOI: 10.1186/s12891-024-08167-6
- [14] Prevention and Treatment of Elbow Stiffness. *The Journal of Hand Surgery*. 2009. DOI: 10.1016/j.jhsa.2009.02.020
- [15] Arthroscopic management of the post-traumatic stiff elbow. *Journal of Shoulder and Elbow Surgery*. 2011. DOI: 10.1016/j.jse.2010.11.029
- [16] The examination and treatment of soft tissue contracture of the elbow. *Journal of ISAKOS*. 2024. DOI: 10.1016/j.jisako.2023.10.006
- [17] Dual mediolateral mini-open technique for the release of elbow contracture. *Journal of Orthopaedic Surgery and Research*. 2025. DOI: 10.1186/s13018-025-06288-9
- [18] Clinical Outcomes Following Surgical Management of Post-Traumatic Elbow Contractures in the Pediatric Age Group: A Meta-Analysis and Systematic Review. *The Journal of Hand Surgery*. 2025. DOI: 10.1016/j.jhsa.2024.01.010
- [19] Bony encasement of the ulnar nerve secondary to heterotopic ossification of the elbow: an evaluation of long-term outcomes. *Journal of Shoulder and Elbow Surgery*. 2024. DOI: 10.1016/j.jse.2023.12.003
- [21] Anterior interosseous nerve palsy in the early postoperative period after open capsular release for elbow stiffness: a case report. *Clinics in Shoulder and Elbow*. 2023. DOI: 10.5397/cise.2022.00899
- [22] Endoscopic anterior capsulectomy for severe elbow contractures. *Journal of ISAKOS*. 2024. DOI: 10.1016/j.jisako.2024.02.003
- [24] Risk factors for dysfunctional elbow stiffness following operative fixation of distal humerus fractures. *Journal of Shoulder and Elbow Surgery*. 2024. DOI: 10.1016/j.jse.2024.06.010
- [29] Hems T. Natural history of elbow flexion and forearm rotation contractures in obstetric brachial plexus injury. *J Hand Surg Eur*. 2022, 47: 1121–7. *Journal of Hand Surgery (European Volume)*. 2023. DOI: 10.1177/17531934231178121
- [30] A comparative analysis of short-term results in range of motion following arthroscopic arthrolysis with vs. without peripheral nerve block in cases of elbow stiffness. *JSES International*. 2025. DOI: 10.1016/j.jseint.2024.10.009
- [34] Total resection and reconstruction of collateral ligaments in severe elbow stiffness induced by heterotopic ossification: a novel approach and review of the literature. *JSES International*. 2026. DOI: 10.1016/j.jseint.2025.101418
- [35] Heterotopic Ossification around the Elbow Revisited. *Life*. 2023. DOI: 10.3390/life13122358