CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Golfer's Elbow

title: “Golfer’s Elbow” slug: golfers-elbow region: elbow audience: patient mesh_terms: [“Elbow Joint”, “Elbow Injuries”, “Elbow”, “Tennis Elbow”, “Baseball”, “Arthroplasty, Replacement, Elbow”, “Collateral Ligaments”, “Joint Dislocations”] article_count: 712 model_used: Qwen3.6-35B-A3B-Q8_0.gguf generated_at: ‘2026-06-21T12:21:10+00:00’ key_articles: - title: “Complex Elbow Instability” ref_num: 1 evidence_tier: paper evidence_level: 5 doi: 10.5435/00124635-200605000-00003 year: 2006 - title: “Percutaneous golfer’s elbow release under local anesthesia: a prospective study” ref_num: 2 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.rboe.2016.06.007 year: 2017 - title: “Complications of Elbow Arthroscopy (SS-67)” ref_num: 3 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.arthro.2007.03.081 year: 2007 - title: “Ulnar Collateral Ligament Injury in the Overhead Athlete” ref_num: 4 evidence_tier: paper doi: 10.1016/j.csm.2010.06.007 year: 2010 - title: “Outcomes After Hemiarthroplasty of the Elbow for the Management of Posttraumatic Arthritis: Minimum 2-Year Follow-up” ref_num: 5 evidence_tier: paper evidence_level: 4 doi: 10.5435/jaaos-d-18-00055 year: 2019 - title: “The examination and treatment of soft tissue contracture of the elbow” ref_num: 6 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.jisako.2023.10.006 year: 2024 - title: “Mid-term results of the Latitude primary total elbow arthroplasty” ref_num: 7 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jse.2021.08.028 year: 2022 - title: “Pediatric Sports Elbow Injuries” ref_num: 8 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.csm.2010.06.010 year: 2010 - title: “Elbow Hemi Arthroplasty Versus Total Elbow Arthroplasty For Irreparable Distal Humeral Fractures. Preliminary Results Of A Randomized Controlled Trial” ref_num: 9 evidence_tier: paper evidence_level: 1 doi: 10.1016/j.jse.2022.01.016 year: 2022 - title: “Nonacute Treatment of Elbow Fracture with Persistent Ulnohumeral Dislocation or Subluxation” ref_num: 10 evidence_tier: paper evidence_level: 5 doi: 10.2106/jbjs.m.00817 year: 2014 - title: “Juvenile and adolescent elbow injuries in sports” ref_num: 11 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.csm.2004.05.001 year: 2004 - title: “Fracture-dislocation of the elbow: diagnosis, treatment, and prognosis” ref_num: 13 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.hcl.2004.06.005 year: 2004 - title: “Elbow Instability in Children” ref_num: 14 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.hcl.2007.11.007 year: 2008 - title: “Standard Surgical Protocol to Treat Elbow Dislocations with Radial Head and Coronoid Fractures” ref_num: 15 evidence_tier: paper evidence_level: 4 doi: 10.2106/jbjs.d.02933 year: 2005 - title: “Surgical treatment and outcomes of trans-ulnar basal coronoid fracture-dislocations” ref_num: 16 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jse.2024.05.024 year: 2024 - title: “Ultrasound Examination Techniques for Elbow Injuries in Overhead Athletes” ref_num: 17 evidence_tier: paper evidence_level: 5 doi: 10.5435/jaaos-d-20-00935 year: 2020 - title: “Terrible Triad Injury of the Elbow: Current Concepts” ref_num: 18 evidence_tier: paper evidence_level: 5 doi:

CQ HAND + UPPER LIMB
Dr Kieran Hirpara — Specialist Orthopaedic Surgeon
Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au

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Overview

- Percutaneous common flexor origin release of medial humeral epicondyle in golfer's elbow appears to be a safe and effective treatment option [2].
- Percutaneous common flexor origin release provides significant and sustainable improvements in pain and function during a 1-year follow-up period [2].
- In experienced hands, elbow arthroscopy is a safe modality of treatment for a variety of pathologies [3].
- In patients with surviving implants, 57% achieved good to excellent Mayo Elbow Performance Scores after hemiarthroplasty of the elbow for posttraumatic arthritis [5].
- Hemiarthroplasty of the elbow for posttraumatic arthritis results in predictable improvement in range of motion [5].

- Survival rates for the Latitude primary total elbow arthroplasty remain low [7].
- Complication rates for the Latitude primary total elbow arthroplasty remain high [7].
- Complication rates for the Latitude primary total elbow arthroplasty are comparable to those of other elbow arthroplasties [7].
- Both hemiarthroplasty and total elbow arthroplasty provided acceptable elbow function for irreparable distal humeral fractures [9].
- Operative repair is indicated for most fracture-dislocations of the elbow to restore sufficient osseoligamentous support [13].
- Operative repair of fracture-dislocations allows safe, early motion and provides a stable functional elbow in the long term [13].
- Use of the standard surgical protocol for elbow dislocations with radial head and coronoid fractures restored sufficient elbow stability to allow early motion postoperatively [15].
- Early motion postoperatively enhances the functional outcome in elbows treated with the standard surgical protocol for dislocations with radial head and coronoid fractures [15].
- The majority of elbows with trans-ulnar basal coronoid fracture-dislocations achieve union [16].
- The majority of elbows with trans-ulnar basal coronoid fracture-dislocations achieve a functional range of motion [16].
- The majority of elbows with trans-ulnar basal coronoid fracture-dislocations achieve reasonable patient reported outcome measures [16].
- Surgery is indicated for unstable elbows requiring flexion beyond 50 to 60 degrees to remain reduced [26].
- Surgery is indicated for unstable periarticular fractures [26].
- The staged protocol utilizing arthroscopic assessment has refined the approach to the painful total elbow arthroplasty [31].
- Arthroscopic assessment directly influences the definitive surgical management of patients with painful total elbow arthroplasty [31].
- The Van Gorder approach is the largest study evaluating the surgical approach to the elbow for primary total elbow arthroplasty [32].
- The study on the Van Gorder approach had an average follow-up of 32 months [32].
- Various approaches to total elbow arthroplasty have reported outcomes that assist surgeons in making an informed choice [62].

Anatomy & Pathophysiology

- The ulnar collateral ligament (UCL) is a key structure in the elbow, with its functional anatomy and biomechanics reviewed in the context of overhead athletes [4].
- UCL injuries in overhead athletes result from repetitive valgus forces during throwing [48].

- Understanding normal elbow anatomy and etiological factors is required to develop effective strategies for treating soft tissue contracture [6].
- Understanding elbow biomechanics and injury mechanisms provides insight into variations of pathology observed in complex elbow dislocations [36].
- An understanding of relevant anatomy and factors associated with elbow stability allows for systematic treatment algorithms to ensure sufficient stability for early motion [18].
- Combining an understanding of anatomy and biomechanics with surgical technique can reconstruct chronically dislocated joints to achieve functional and painless elbows [38].
- Musculoskeletal ultrasonography allows for dynamic, functional assessment of elbow structures, including visualization of pathology under stress and motion [17].
- Elbow joint loads vary in different directions during simulated activities of daily living [37].
- Varus loads simulating everyday activities produce changes in varus joint angulation that are linearly dependent on the applied moment and persist after release of lateral stabilizing structures [42].
- Overhead elbow extension results in similar kinematics between an intact elbow and an elbow with medial collateral ligament (MCL) and lateral collateral ligament (LCL) tears [43].
- Biomechanical enhancement of elbow stability with a monopolar radial head prosthesis is superior to that with a bipolar design [45].
- Ulnar collateral ligament reconstruction using a suspension button fixation technique reliably restores elbow kinematics to the intact state [49].
- Increasing pitch count is associated with increasing elbow flexion angle at ball release in youth baseball pitchers [40].
- Pitching with fatigue may cause biomechanical changes associated with increased rates of elbow injury in the adult throwing population [40].
- Increased elbow flexion places the medial elbow in a position to carry a greater amount of load, which may be exacerbated during the final moments of the pitching motion [47].
- Normalized elbow varus torque is associated with ball velocity and other kinematic parameters in elite adult baseball pitchers [44].
- Increased medial elbow torque is associated with greater ball velocity regardless of the history of medial elbow injuries in youth baseball pitchers [50].
- Biomechanical variables correlated with peak valgus torque are not easily modifiable, suggesting that limiting innings pitched is the best way to reduce elbow injury in youth pitchers [52].

Classification

- Complex elbow injuries are classified as complex elbow instability [1].
- The thrower's elbow is a distinct pathophysiological entity involving the ulnar collateral ligament [4].

- Elbow injuries in young athletes require evaluation based on immature developing anatomy and specific injury pathophysiology [8].
- Elbow instability in children includes both traumatic and nontraumatic causes [14].
- The terrible triad is a specific type of complex elbow fracture-dislocation [18].
- Complex fracture-dislocations of the proximal ulna and radius in adults have a comprehensive classification system that is reproducible [39].
- Persistent symptomatic olecranon physis in adolescent throwing athletes has a radiographic classification useful for treatment decision making [71].

Clinical Presentation

- Golfer's elbow is characterized by pain and functional impairment at the medial humeral epicondyle [2].
- Percutaneous common flexor origin release of the medial humeral epicondyle provides significant and sustainable improvements in pain and function during a 1-year follow-up period [2].
- Elbow assessment is essential for accurate diagnosis and initiating proper treatment [21].
- Isolated elbow injuries are rare, and fractures should be interpreted as proxies for associated soft tissue injuries [21].
- A comprehensive approach to the physical examination of the elbow, including special tests, may facilitate improved diagnosis of elbow pathology [19].
- Post-traumatic osteoarthritis of the elbow is an uncommon condition where clinical manifestations often vary from radiological findings [22].
- Evaluation and management of elbow injuries in young athletes requires knowledge of the immature developing anatomy, injury pathophysiology, and established treatment algorithms for each diagnosis [8].
- Optimal treatment of elbow injuries in the skeletally immature athlete requires a knowledge of the complex developmental and radiographic anatomy, an understanding of the pathophysiology and natural history of its disorders, and a knowledge of the indications and expected outcomes for conservative and operative management [11].
- Dominant elbow MRI abnormalities are common in asymptomatic Little League baseball players and commonly progress over three years, especially amongst players who continue to play baseball [24].
- Baseball and softball players frequently present with elbow, wrist, and hand complaints [53].
- Familiarity with player-specific treatment algorithms is essential for managing these patients and preventing future injury [53].
- Incarceration of the medial epicondyle in the joint often occurs in association with an elbow dislocation and is important to consider to avoid diagnostic mistakes [54].

Investigations

- Elbow arthroscopy is a safe modality of treatment for a variety of pathologies in experienced hands [3].
- Musculoskeletal ultrasonography provides a dynamic, functional assessment of elbow structures, allowing visualization of pathology under stress and motion [17].
- Adequate elbow assessment is essential for accurate diagnosis and initiating proper treatment [21].
- Isolated elbow injuries are rare [21].
- Fractures should be interpreted as proxies for associated soft tissue injuries [21].
- Post-traumatic osteoarthritis of the elbow is an uncommon condition where clinical manifestations often vary from radiological findings [22].
- Dominant elbow MRI abnormalities are common in asymptomatic Little League baseball players [24].
- Dominant elbow MRI abnormalities commonly progress over three years in Little League baseball players, especially amongst players who continue to play baseball [24].
- Lower MRI grade and humeral location of UCL tears are objectively associated with higher return to throw, higher return to play, lower UCLR, and higher survival compared to higher grade and ulnar or both-sided tears [34].
- Increased MRI signal in the ECRB origin is common in symptomatic and asymptomatic elbows [64].
- Interobserver reliability for reading predraft elbow MRI on MLB prospects was acceptable following the definition of pathology [65].
- The coronoid opening angle is a novel radiographic technique that can be of value alongside 3-dimensional imaging in evaluating elbow injuries and used as an adjunct in clinical decision making [66].
- There is a high rate of abnormal magnetic resonance imaging findings in asymptomatic throwers' elbows, demonstrating evidence of subclinical medial collateral ligament injury and posteromedial impingement [67].
- Most young patients with elbow dislocations are successfully treated without ligament repair, so there should be an emphasis on not overanalyzing and treating based on MRI findings alone [69].
- Changes in the UCL detectable on ultrasound may help distinguish elbows at risk for later clinical UCL insufficiency [75].
- Preseason and post-season MRI abnormalities of the medial elbow are common in Little League baseball players [77].
- MRI abnormalities involving the medial aspect of the elbow are common in year-round Little League baseball players, especially those with internal rotation deficits and private coaches [61].
- Interobserver and intraobserver agreement of ligamentous injuries on conventional MRI after simple elbow dislocation should be the basis to develop new MRI quality standards with special focus on coronal oblique reconstructions to improve the evaluation of ligament injuries [81].
- There was no difference in MRI grades of the UCL between symptomatic and asymptomatic elbows in baseball players [84].

- Approximately 30% of elbows demonstrated high-grade UCL injuries in both symptomatic and asymptomatic groups in baseball players [84].
- The diagnostic and prognostic value of MRI imaging in lateral epicondylar tendinopathy is drawn into question, especially in older patients [85].
- Ultrasound assessment of traumatic elbow lesions could be performed by an orthopedic surgeon on a well-defined protocol, and lesions on ultrasound matched clinical symptomatology [86].

Treatment

NON-OPERATIVE MANAGEMENT

- Percutaneous common flexor origin release of the medial humeral epicondyle provides significant and sustainable improvements in pain and function during a 1-year follow-up period [2].
- Tennis elbow resolves by 6 months in most cases regardless of the treatment used [30].
- For patients who do not respond to nonoperative approaches, surgery for tennis elbow provides near 90% satisfaction rates [30].
- Conservative management is the gold standard for most simple elbow dislocations [76].
- Patients after conservatively treated simple elbow dislocations show good clinical and functional results [83].
- Elbow valgus instability in the throwing athlete may be managed nonsurgically [82].
- Lower MRI grade and humeral location of UCL tears are objectively associated with higher return to throw, higher return to play, lower UCLR rates, and higher survival compared to higher grade and ulnar or both-sided tears [34].
- The Elbow UCL Injury Prognosis Score predicts which patients would succeed with nonoperative management to avoid unnecessary surgery [72].
- The Elbow UCL Injury Prognosis Score identifies patients for whom nonoperative management would delay the inevitable need for surgical intervention [72].

OPERATIVE MANAGEMENT

- Percutaneous common flexor origin release of the medial humeral epicondyle is a safe and effective treatment option for golfer's elbow [2].
- In experienced hands, elbow arthroscopy is a safe modality of treatment for a variety of pathologies [3].
- Surgery is indicated for unstable elbows requiring flexion beyond 50 to 60 degrees to remain reduced [26].
- Surgery is indicated for unstable periarticular fractures [26].
- Operative repair is indicated for most elbow fracture-dislocations to restore sufficient osseoligamentous support to allow safe, early motion and provide a stable functional elbow in the long term [13].
- The primary goal of treatment for nonacute elbow fracture with persistent ulnohumeral dislocation or subluxation is stable reduction of the ulnohumeral joint and functional elbow motion [10].

- Use of a standard surgical protocol for elbow dislocations with radial head and coronoid fractures restored sufficient elbow stability to allow early motion postoperatively, enhancing functional outcome [15].
- The majority of elbows treated surgically for trans-ulnar basal coronoid fracture-dislocations achieve union, a functional range of motion, and reasonable patient reported outcome measures [16].
- Hinged external fixation is indicated for acute or chronic instability of the elbow after trauma [60].
- Hinged external fixation is indicated for distraction interposition arthroplasty [60].
- Hinged external fixation is indicated for use after contracture release or excision of heterotopic ossification [60].
- Arthroscopic or open capsular release, arthroplasty, and elbow replacement are surgical options for elbow stiffness [73].
- Graft reconstructions may not be necessary to obtain favorable outcomes and rapid return to sports in nonprofessional athletes requiring surgical intervention for medial elbow instability [79].
- Primary repair of Ulnar Collateral Ligament injuries is an option for young athletes [79].
- Both hemiarthroplasty and total elbow arthroplasty provide acceptable elbow function for irreparable distal humeral fractures [9].
- In patients with surviving implants, 57% of those undergoing hemiarthroplasty achieved good to excellent Mayo Elbow Performance Scores with predictable improvement in range of motion [5].
- Survival rates for primary total elbow arthroplasty using the Latitude implant remain low and complication rates remain high, though comparable to other elbow arthroplasties [7].
- The age at surgery is a risk factor for complications in total elbow arthroplasty, and the indication for TEA in patients under 60 should be carefully considered [63].
- There are no contraindications to bipolar radial head prostheses in elbow dislocation with associated injuries [58].
- Long-term outcome with surgical management of complex elbow injuries is unknown [1].

Complications

- Long-term outcomes with surgical management of complex elbow injuries are unknown [1].
- Percutaneous common flexor origin release for golfer's elbow provides significant and sustainable improvements in pain and function during a 1-year follow-up period [2].
- Elbow arthroscopy is a safe modality of treatment for a variety of pathologies in experienced hands [3].
- Hemiarthroplasty of the elbow for posttraumatic arthritis results in 57% of patients with surviving implants achieving good to excellent Mayo Elbow Performance Scores with predictable improvement in range of motion [5].
- Survival rates for the Latitude primary total elbow arthroplasty remain low and complication rates remain high, though comparable to other elbow arthroplasties [7].

- The GSBIII elbow replacement provides good long-term function with a low revision rate and few complications [20].
- Open arthrolysis combined with radial head arthroplasty yields satisfactory short-term outcomes for post-traumatic elbow stiffness at 3 years, with substantial improvements in elbow mobility and function, and results are durable over the long term (8 years) [29].
- Long-term survival of semiconstrained elbow arthroplasties is favorable, but wear of the hinge mechanism is a risk during follow-up [55].
- Achieving full stability of the elbow and avoiding overstuffing are necessary to prevent acute disassembly of a bipolar radial head arthroplasty [56].
- Few patients with simple elbow dislocations develop complications requiring surgery, but those that do most commonly undergo soft-tissue stabilisation or contracture release within 4 years of the injury [74].
- Factors clinically associated with an increased risk of deep infection with hinged external fixators of the elbow include a history of prior procedures in the post-traumatic elbow and the complexity of the operative technique [78].
- Postoperative complications including synostosis and elbow instability after the Boyd approach may not be as common as previously understood [80].

Recovery

- Percutaneous common flexor origin release of the medial humeral epicondyle for golfer's elbow provides significant and sustainable improvements in pain and function during a 1-year follow-up period [2].
- In patients with surviving implants, 57% achieved good to excellent Mayo Elbow Performance Scores with predictable improvement in range of motion following hemiarthroplasty of the elbow for posttraumatic arthritis [5].
- Both hemiarthroplasty and total elbow arthroplasty provided acceptable elbow function for irreparable distal humeral fractures [9].
- The GSBIII elbow replacement provides good long-term function with a low revision rate and few complications [20].
- The terrible triad of the elbow is surgically treatable to allow a high functional standard in the long term [25].
- Open arthrolysis combined with radial head arthroplasty yielded satisfactory short-term outcomes for post-traumatic elbow stiffness at 3 years, with substantial improvements in elbow mobility and function, and results were durable over the long term (8 years) [29].
- A 69-year clinical and radiologic follow-up was reported for a previously unknown radial head prosthesis [35].
- Following complex elbow instability surgical treatment, a rehabilitation programme needs to be started promptly and continued for at least 6 months because a significant improvement of range of motion occurs

prevalently in this period, which is the critical time period to obtain a functional elbow in a majority of patients [88].

- Following ulnar collateral ligament repairs and reconstructions, elbow range of motion is reliably preserved or improved with a predictable trajectory of rapid improvement within the first 2 to 4 months [90].

Key Evidence

- [L5] Long-term outcome with surgical management of complex elbow injuries is unknown. (10.5435/00124635-200605000-00003)
- [L4] Percutaneous common flexor origin release of medial humeral epicondyle in golfer's elbow appears to be a safe and effective treatment option and provides significant and sustainable improvements in pain and function during a 1-year follow-up period. (10.1016/j.rboe.2016.06.007)
- [L4] In experienced hands, elbow arthroscopy is a safe modality of treatment for a variety of pathologies. (10.1016/j.arthro.2007.03.081)
- [Paper] This article reviews the functional anatomy and biomechanics of the ulnar collateral ligament, the pathophysiology of the thrower's elbow, and its history, physical examination, imaging modalities, and treatment options. (10.1016/j.csm.2010.06.007)
- [L4] In patients with surviving implants, 57% achieved good to excellent Mayo Elbow Performance Scores with predictable improvement in range of motion. (10.5435/jaaos-d-18-00055)
- [L5] Treatment of the stiff elbow requires a thorough understanding of normal anatomy and etiological factors to develop effective strategies. (10.1016/j.jisako.2023.10.006)
- [L4] Survival rates nonetheless remain low and complication rates remain high yet are comparable to those of other elbow arthroplasties. (10.1016/j.jse.2021.08.028)
- [L5] Evaluation and management of elbow injuries in young athletes requires knowledge of the immature developing anatomy, injury pathophysiology, and established treatment algorithms for each diagnosis. (10.1016/j.csm.2010.06.010)
- [L1] Both treatments provided acceptable elbow function. (10.1016/j.jse.2022.01.016)
- [L5] The primary goal of treatment is stable reduction of the ulnohumeral joint and functional elbow motion. (10.2106/jbjs.m.00817)
- [L5] Optimal treatment of elbow injuries in the skeletally immature athlete requires a knowledge of the complex developmental and radiographic anatomy, an understanding of the pathophysiology and natural history of its disorders, and a knowledge of the indications and expected outcomes for conservative and operative management. (10.1016/j.csm.2004.05.001)
- [L5] Operative repair is indicated for most of these injuries to restore sufficient osseoligamentous support to allow safe, early motion and provide a stable functional elbow in the long term. (10.1016/j.hcl.2004.06.005)
- [L5] The article reviews current concepts of injuries leading to elbow instability in children, discusses recognition and treatment of instability, and addresses nontraumatic causes. (10.1016/j.hcl.2007.11.007)

- [L4] Use of the surgical protocol restored sufficient elbow stability to allow early motion postoperatively, enhancing the functional outcome. (10.2106/jbjs.d.02933)
- [L4] However, the majority of elbows achieve union, a functional range of motion, and reasonable patient reported outcome measures. (10.1016/j.jse.2024.05.024)
- [L5] Musculoskeletal ultrasonography provides a dynamic, functional assessment of elbow structures, allowing visualization of pathology under stress and motion. (10.5435/jaaos-d-20-00935)
- [L5] Despite the complexities of this injury, an understanding of the relevant anatomy and the factors associated with elbow stability allows the application of a systematic algorithm for treatment that can help ensure sufficient elbow stability to allow early motion, thereby leading to improved outcomes in most patients. (10.5435/00124635-200903000-00003)
- [L5] A comprehensive approach to the physical examination of the elbow, including special tests, may facilitate improved diagnosis of elbow pathology. (10.5435/jaaos-d-16-00622)
- [L4] The GSBIII elbow replacement provides good long-term function with a low revision rate and few complications. (10.1016/j.jse.2015.10.013)
- [L5] Adequate elbow assessment is essential for accurate diagnosis and initiating proper treatment, as isolated elbow injuries are rare and fractures should be interpreted as proxies for associated soft tissue injuries. (10.1016/j.jhsa.2014.04.028)
- [L4] Post-traumatic osteoarthritis of the elbow is an uncommon condition where clinical manifestations often vary from radiological findings. (10.1016/j.otsr.2013.11.004)
- [L3] Dominant elbow MRI abnormalities are common in asymptomatic Little League baseball players and commonly progress over three years, especially amongst players who continue to play baseball. (10.1177/2325967119s00060)
- [L4] This study adds to the evidence that the terrible triad of the elbow is surgically treatable to allow a high functional standard not only in the short-term but also in the long term. (10.1016/j.jse.2024.06.023)
- [L5] Surgery is indicated for unstable elbows requiring flexion beyond 50 to 60 degrees to remain reduced or for unstable periarticular fractures. (10.5435/00124635-199801000-00002)
- [L4] OEA with RHA yielded satisfactory short-term outcomes for PTES at 3 years, with substantial improvements in elbow mobility and function, and the results were durable over the long term (8 years). (10.1016/j.jse.2021.10.028)
- [L5] Tennis elbow is a common problem that resolves by 6 months in most cases no matter what treatment is used, but for the small percentage of patients who do not respond to nonoperative approaches, surgery provides near 90% satisfaction rates. (10.1016/j.arthro.2017.02.020)
- [L4] The staged protocol described in the present study, utilizing arthroscopic assessment, has refined the approach to the painful total elbow arthroplasty because it directly influences the definitive surgical management of the patient. (10.1177/1758573215591946)
- [L4] This is the largest study evaluating the Van Gorder surgical approach to the elbow for primary TEA with an average follow-up of 32 months. (10.1016/j.jse.2021.09.005)

- [L3] Lower MRI grade and humeral location were objectively associated with higher return to throw, higher return to play, lower UCLR, and higher survival compared to higher grade and ulnar or both-sided tears. (10.1177/2325967119s00311)
- [L4] We have reported a 69-year clinical and radiologic follow-up of a previously unknown radial head prosthesis. (10.1016/j.jse.2014.09.030)
- [L4] Understanding elbow biomechanics and the injury mechanism provides valuable insight into the variations of pathology that may be observed. (10.5435/jaaos-d-14-00023)
- [L5] This study analyzed elbow joint moments in different directions during daily tasks. (10.1016/j.jse.2023.07.042)
- [L4] By combining an understanding of anatomy and biomechanics with surgical technique, the authors could reconstruct chronically dislocated joints to achieve functional and painless elbows. (10.1016/j.jse.2006.09.003)
- [L3] The authors created a comprehensive classification of complex fracture-dislocations of the elbow that appeared to be reproducible and may represent a useful tool for the management of such difficult injuries. (10.1016/j.jse.2011.06.003)
- [L5] These findings demonstrate that pitching with fatigue may cause biomechanical changes that have been associated with increased rates of elbow injury in the adult throwing population. (10.1016/j.jse.2024.05.050)
- [L5] Varus loads simulating everyday activities produce changes in the varus joint angulation of the elbow that are linearly dependent on the applied moment and persist after release of the lateral stabilizing structures. (10.1177/03635465211018208)
- [L5] Overhead elbow extension results in similar kinematics between an intact elbow and an elbow with MCL and LCL tears. (10.1016/j.jht.2022.01.008)
- [L4] Normalized elbow varus torque was associated with ball velocity and 10 other kinematic parameters. (10.1177/23259671241300560)
- [L5] From a biomechanical perspective, the enhancement of elbow stability with a monopolar radial head prosthesis is superior to that with a bipolar design. (10.1016/j.jse.2010.10.033)
- [L4] Increasing elbow flexion has been shown to place the medial elbow in a position to carry a greater amount of load, which may be exacerbated during the final moments of the pitching motion. (10.1177/03635465211072223)
- [L5] This article reviews the anatomy, biomechanics, pathophysiology, diagnosis, and treatment options for ulnar collateral ligament injuries in overhead athletes, emphasizing that the injury is not uncommon and results from repetitive valgus forces during throwing. (10.1016/j.csm.2004.05.002)
- [L5] Ulnar collateral ligament reconstruction using a suspension button fixation technique reliably restored elbow kinematics to the intact state. (10.1177/0363546509350109)
- [L2] Increased medial elbow torque was associated with greater ball velocity regardless of the history of medial elbow injuries. (10.1016/j.arthro.2022.07.016)

- [L5] Given that the biomechanical variables correlated with peak valgus torque are not easily modifiable, limiting the number of innings pitched is likely the best way to reduce elbow injury in youth pitchers. (10.1016/j.jse.2004.01.013)
- [L5] Baseball and softball players frequently present with elbow, wrist, and hand complaints; familiarity with these conditions and player-specific treatment algorithms is essential for managing these patients and preventing future injury. (10.1016/j.jhsa.2014.11.024)
- [Case_report] Incarceration of the medial epicondyle in the joint often occurs in association with an elbow dislocation and is important to consider to avoid diagnostic mistakes. (10.1016/j.jse.2011.09.030)
- [Case_report] Long-term survival of semiconstrained elbow arthroplasties is favorable, but wear of the hinge mechanism is a risk during follow-up. (10.1016/j.otsr.2014.07.013)
- [L4] Achieving full stability of the elbow and avoiding overstuffing are necessary to prevent this complication. (10.1016/j.otsr.2010.02.015)
- [L3] The authors see no contraindications to bipolar radial head prostheses in elbow dislocation with associated injuries. (10.1016/j.otsr.2019.10.027)
- [L5] The most common indications are acute or chronic instability of the elbow after trauma, distraction interposition arthroplasty, or use after contracture release or excision of heterotopic ossification. (10.1016/j.hcl.2010.04.004)
- [L3] MRI abnormalities involving the medial aspect of the elbow are common in year-round Little League baseball players, especially those with internal rotation deficits and private coaches. (10.2106/jbjs.15.01017)
- [L4] The review discusses various approaches to total elbow arthroplasty and their reported outcomes to assist surgeons in making an informed choice. (10.1177/1758573216682479)
- [L4] The age at surgery is a risk factor for complications, and the indication for total elbow arthroplasty in patients under 60 should be carefully considered. (10.1016/j.otsr.2013.10.012)
- [L4] Increased MRI signal in the ECRB origin is common in symptomatic and in asymptomatic elbows. (10.1016/j.jse.2016.01.033)
- [L4] Interobserver reliability was acceptable following the definition of pathology when reading predraft elbow MRI on MLB prospects. (10.1016/j.jse.2024.05.021)
- [L4] It can be of value alongside 3-dimensional imaging in evaluating elbow injuries and used as an adjunct in clinical decision making. (10.1016/j.jse.2021.12.039)
- [L4] This study demonstrates a high rate of abnormal magnetic resonance imaging findings in asymptomatic throwers' elbows. (10.1177/0363546503262646)
- [L4] Given that most young patients with elbow dislocations are successfully treated without ligament repair, there should be an emphasis on not overanalyzing and treating based on MRI findings alone. (10.1177/1558944720949961)
- [L3] The radiographic classification of persistent olecranon physis is useful for treatment decision making. (10.1177/0363546509342677)

- [L3] The Elbow UCL Injury Prognosis Score was created to predict which patients would succeed with nonoperative management and avoid unnecessary surgery while simultaneously identifying patients for whom nonoperative management would delay the inevitable need for a surgical intervention. (10.1177/03635465251366318)
- [L5] Treatment choices must consider non-surgical management and various surgical options including arthroscopic or open capsular release, arthroplasty, and elbow replacement. (10.1016/j.jisako.2023.10.009)
- [Paper] Few patients with simple elbow dislocations develop complications requiring surgery, but those that do most commonly undergo soft-tissue stabilisation or contracture release within 4 years of the injury. (10.1016/j.injury.2015.02.009)
- [L2] Our data suggests that changes present in the UCL and detectable on ultrasound may help distinguish elbows at risk for later clinical UCL insufficiency. (10.1177/2325967115s00162)
- [L4] Conservative management remains the gold standard for most simple elbow dislocations. (10.1016/j.arthro.2014.02.037)
- [L3] Pre-season and post-season MRI abnormalities of the medial elbow are common in Little League baseball players. (10.1177/2325967116s00141)
- [L4] Factors clinically associated with an increased risk of deep infection include a history of prior procedures in the post-traumatic elbow and the complexity of the operative technique. (10.1016/j.jse.2007.10.006)
- [L4] Graft reconstructions may not be necessary to obtain favorable outcomes and rapid return to sports in nonprofessional athletes who require surgical intervention for medial elbow instability. (10.1177/0363546508315201)
- [L4] Postoperative complications including synostosis and elbow instability may not be as common as previously understood. (10.1016/j.jse.2023.06.005)
- [L4] This should be the basis to develop new MRI quality standards with special focus on coronal oblique reconstructions to improve the evaluation of ligament injuries after simple elbow dislocations. (10.1186/s12891-017-1451-2)
- [L5] Elbow valgus instability in the throwing athlete may be managed either nonsurgically or surgically. (10.5435/00124635-200611000-00014)
- [L4] Patients after conservatively treated simple elbow dislocations show good clinical and functional results. (10.1007/s00167-016-4176-0)
- [L3] There was no difference in MRI grades of the UCL between symptomatic and asymptomatic elbows in baseball players; approximately 30% of elbows demonstrated high-grade UCL injuries in both groups. (10.1177/03635465241259472)
- [L4] This draws into question the diagnostic and prognostic value of MRI imaging in lateral epicondylar tendinopathy, especially in older patients. (10.1177/17585732221146731)
- [L4] Ultrasound assessment of traumatic elbow lesions could be performed by an orthopedic surgeon on a well-defined protocol, and lesions on ultrasound matched clinical symptomatology. (10.1016/j.otsr.2021.102836)

- [L3] Following CEI surgical treatment, a rehabilitation programme needs to be started promptly and continued for at least 6 months because a significant improvement of ROM occurs prevalently in this period, which should be considered the critical time period to obtain a functional elbow in a majority of patients. (10.1016/j.injury.2013.11.033)
- [L4] Following UCL repairs and reconstructions, elbow ROM is reliably preserved or improved with a predictable trajectory of rapid improvement within the first 2 to four months. (10.1016/j.jse.2025.10.002)

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CQ HAND + UPPER LIMB
Dr Kieran Hirpara — Specialist Orthopaedic Surgeon
Suite 2, Level 1, Mater Private Hospital Rockhampton, 31 Ward Street, The Range, QLD 4700
Phone 07 4863 6556 · office@cqupperlimb.com.au · cqupperlimb.com.au