CQ HAND + UPPER LIMB
SPECIALIST ORTHOPAEDIC SURGEON

EVIDENCE SUMMARY

Cubital Tunnel Syndrome

title: “Cubital Tunnel Syndrome” slug: cubital-tunnel-syndrome region: elbow audience: patient mesh_terms: [“Cubital Tunnel Syndrome”, “Decompression, Surgical”, “Ulnar Nerve”, “Elbow”, “Elbow Joint”, “Ulnar Nerve Compression Syndromes”, “Carpal Tunnel Syndrome”, “Endoscopy”] article_count: 327 model_used: Qwen3.6-35B-A3B-Q8_0.gguf generated_at: ‘2026-06-13T09:40:59+00:00’ key_articles: - title: “The Management of Cubital Tunnel Syndrome” ref_num: 1 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.jhsa.2015.03.011 year: 2015 - title: “Factors Associated With Severity of Cubital Tunnel Syndrome at Presentation” ref_num: 2 evidence_tier: paper evidence_level: 3 doi: 10.1177/15589447211058821 year: 2021 - title: “Muscle Atrophy at Diagnosis of Carpal and Cubital Tunnel Syndrome” ref_num: 3 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2007.03.009 year: 2007 - title: “Patient-Rated Outcome of Ulnar Nerve Decompression: A Comparison of Endoscopic and Open In Situ Decompression” ref_num: 4 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2009.05.014 year: 2009 - title: “Cubital tunnel syndrome: Comparative results of a multicenter study of 4 surgical techniques with a mean follow-up of 92 months” ref_num: 5 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.otsr.2014.03.009 year: 2014 - title: “Cubital Tunnel Syndrome: Current Concepts” ref_num: 6 evidence_tier: paper evidence_level: 4 doi: 10.1007/s12178-020-09650-y year: 2020 - title: “Modern Treatment of Cubital Tunnel Syndrome: Evidence and Controversy” ref_num: 7 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsg.2022.07.008 year: 2023 - title: “Cubital Tunnel Syndrome” ref_num: 8 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.ocl.2012.07.017 year: 2012 - title: “Prospective Cohort Study of Symptom Resolution outside of the Ulnar Nerve Distribution following Cubital Tunnel Release” ref_num: 9 evidence_tier: paper evidence_level: 3 doi: 10.1007/s11552-014-9688-9 year: 2014 - title: “Muscle Atrophy at Presentation of Cubital Tunnel Syndrome” ref_num: 10 evidence_tier: paper evidence_level: 4 doi: 10.1177/1558944716643096 year: 2016 - title: “Diagnosis of Cubital Tunnel Syndrome” ref_num: 11 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2011.03.021 year: 2011 - title: “The effect of social deprivation on the incidence rate of carpal and cubital tunnel syndrome surgery” ref_num: 12 evidence_tier: paper evidence_level: 4 doi: 10.1177/1753193420939384 year: 2020 - title: “Outcomes Measures Used to Assess Results After Surgery for Cubital Tunnel Syndrome: A Systematic Review of the Literature” ref_num: 13 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2009.05.010 year: 2009 - title: “Endoscopic cubital tunnel decompression: state of the art” ref_num: 14 evidence_tier: paper evidence_level: 5 doi: 10.1136/jisakos-2020-000506 year: 2021 - title: “Minimal-Incision In Situ Ulnar Nerve Decompression at the Elbow” ref_num: 17 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.hcl.2013.08.019 year: 2014 - title: “CUBITAL TUNNEL SYNDROME AND THE PAINFUL UPPER EXTREMITY” ref_num: 18 evidence_tier:

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

paper evidence_level: 5 doi: 10.1016/s0749-0712(21)00356-5 year: 1996 - title: “Surgical and Nonsurgical Treatment of Cubital Tunnel Syndrome in Pediatric and Adolescent Patients” ref_num: 19 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2012.01.016 year: 2012 - title: “Conservative Treatment of the Cubital Tunnel Syndrome” ref_num: 20 evidence_tier: paper evidence_level: 2 doi: 10.1177/1753193408098480 year: 2009 - title: “Nerve Conduction Study Results for Suspected Cubital Tunnel Syndrome” ref_num: 21 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jse.2020.01.064 year: 2020 - title: “Surgical Outcomes of Cubital Tunnel Syndrome in Pediatric and Adolescent Patients” ref_num: 22 evidence_tier: paper evidence_level: 4 doi: 10.1016/s0363-5023(11)60063-4 year: 2011 - title: “Rates of Complications and Secondary Surgeries After In Situ Cubital Tunnel Release Compared With Ulnar Nerve Transposition: A Retrospective Review” ref_num: 24 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2017.01.020 year: 2017 - title: “CUBITAL TUNNEL SYNDROME” ref_num: 25 evidence_tier: paper evidence_level: 5 doi: 10.1016/s0749-0712(21)00325-5 year: 1996 - title: “Bony encasement of the ulnar nerve secondary to heterotopic ossification of the elbow: an evaluation of long-term outcomes” ref_num: 26 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jse.2023.12.003 year: 2024 - title: “Selection of Operative Procedures for Cubital Tunnel Syndrome” ref_num: 29 evidence_tier: paper evidence_level: 4 doi: 10.1007/s11552-008-9133-z year: 2008 - title: “Open vs Retractor-Endoscopic In Situ Decompression of the Ulnar Nerve in Cubital Tunnel Syndrome” ref_num: 30 evidence_tier: paper evidence_level: 3 doi: 10.1227/neu.0b013e3182846dbd year: 2013 - title: “Recurrent or Persistent Cubital Tunnel Syndrome” ref_num: 31 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2011.11.024 year: 2012 - title: “Simple Decompression with Small Skin Incision for Cubital Tunnel Syndrome” ref_num: 32 evidence_tier: paper evidence_level: 4 doi: 10.1054/jhsb.2002.0821 year: 2002 - title: “Cubital tunnel syndrome. Treatment by medial epicondylectomy.” ref_num: 33 evidence_tier: paper evidence_level: 4 doi: 10.2106/00004623-198062060-00016 year: 1980 - title: “Simultaneous Bilateral Carpal and Cubital Tunnel Releases” ref_num: 34 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2017.06.033 year: 2017 - title: “Contribution of static and dynamic ultrasound in cubital tunnel syndrome” ref_num: 35 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.otsr.2014.03.008 year: 2014 - title: “Concomitant Endoscopic Carpal and Cubital Tunnel Release: Safety and Efficacy” ref_num: 36 evidence_tier: paper evidence_level: 4 doi: 10.1007/s11552-013-9552-3 year: 2013 - title: “Comparative study between minimal medial epicondylectomy and anterior subcutaneous transposition of the ulnar nerve for cubital tunnel syndrome” ref_num: 37 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jse.2005.10.007 year: 2006 - title: “Ulnar nerve palsy caused by synovial protrusion in synovial chondromatosis of the elbow: a case report and literature review” ref_num: 38 evidence_tier: case_report evidence_level: 4 doi: 10.1177/1758573216683396 year: 2016 - title: “Endoscopic Versus Open Cubital Tunnel Release” ref_num: 39 evidence_tier: paper evidence_level: 1 doi: 10.1177/1558944715616097 year: 2016 - title: “Incidence of Re-Operation and Subjective Outcome Following in Situ Decompression of the Ulnar Nerve at the Cubital Tunnel” ref_num: 40 evidence_tier: paper evidence_level: 4 doi: 10.1177/1753193408101467 year: 2009 - title: “Surgical Approaches and Their Outcomes in the Treatment of Cubital Tunnel Syndrome” ref_num: 41 evidence_tier: paper evidence_level: 4 doi: 10.3389/fsurg.2018.00048 year: 2018 - title: “Classification and Treatment of Ulnar Nerve Subluxation Following Endoscopic Cubital Tunnel Release” ref_num: 43 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsg.2020.05.001 year: 2020 - title: “The 7 Structures Distal to the Elbow That Are Critical to Successful Anterior Transposition of the Ulnar Nerve” ref_num: 44 evidence_tier: paper evidence_level: 5 doi: 10.1177/1558944718771390 year: 2018 - title: “Ulnar Nerve Cross-Sectional Area for the Diagnosis of Cubital Tunnel Syndrome: A Meta-Analysis of Ultrasonographic Measurements” ref_num: 47 evidence_tier:

paper evidence_level: 1 doi: 10.1016/j.apmr.2017.08.467 year: 2018 - title: “Quantitative magnetic resonance imaging analysis of the cross-sectional areas of the anconeus epitrochlearis muscle, cubital tunnel, and ulnar nerve with the elbow in extension in patients with and without ulnar neuropathy” ref_num: 48 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jse.2018.03.021 year: 2018 - title: “Laxity of the Ulnar Nerve During Elbow Flexion and Extension” ref_num: 49 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.jhsa.2012.03.016 year: 2012 - title: “Dynamic analysis of the ulnar nerve and cubital tunnel morphology using ultrasonography: a cadaveric study” ref_num: 50 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.jse.2022.05.026 year: 2022 - title: “Ulnar collateral ligament insufficiency affects cubital tunnel syndrome during throwing motion: a cadaveric biomechanical study” ref_num: 51 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.jse.2019.02.009 year: 2019 - title: “Surgical Demographics of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome Over 5 Years at a Single Institution” ref_num: 53 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsa.2017.07.009 year: 2017 - title: “Gray-Scale and Power Doppler Ultrasound Findings Predictive of Cubital Tunnel Syndrome Severity” ref_num: 54 evidence_tier: paper evidence_level: 3 doi: 10.1177/15589447221127334 year: 2022 - title: “Association between the disease severity and extraneural pressure induced by maximum elbow flexion in patients with cubital tunnel syndrome” ref_num: 55 evidence_tier: paper evidence_level: 4 doi: 10.3109/2000656x.2012.747962 year: 2013 - title: “Shoulder position increases ulnar nerve strain at the elbow of patients with cubital tunnel syndrome” ref_num: 56 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jse.2015.01.014 year: 2015 - title: “Dynamic Evaluation of Intraneural Microvascularity of the Ulnar Nerve Using Contrast-Enhanced Ultrasonography in Patients With Cubital Tunnel Syndrome” ref_num: 57 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2021.06.024 year: 2022 - title: “Association Between the Elbow Flexion Test and Extraneural Pressure Inside the Cubital Tunnel” ref_num: 58 evidence_tier: paper evidence_level: 3 doi: 10.1016/j.jhsa.2010.11.013 year: 2011 - title: “Biomechanical analysis of ulnar nerve gliding and elongation: implications for nonsurgical ulnar nerve release in cubital tunnel syndrome” ref_num: 59 evidence_tier: paper evidence_level: 4 doi: 10.5397/cise.2024.00934 year: 2025 - title: “A cadaveric study of ulnar nerve strain at the elbow associated with cubitus valgus/varus deformity” ref_num: 61 evidence_tier: paper evidence_level: 5 doi: 10.1186/s12891-022-05786-9 year: 2022 - title: “Nerve injuries in the throwing elbow” ref_num: 62 evidence_tier: paper evidence_level: 5 doi: 10.1016/j.csm.2004.04.012 year: 2004 - title: “Dynamic Compression of the Ulnar Nerve Associated With the Anconeus Epitrochlearis Muscle: Do We Really Know Everything?” ref_num: 64 evidence_tier: paper evidence_level: 4 doi: 10.1016/j.jhsg.2022.11.002 year: 2023 synthesis_version: “v2” verifier_status: skipped

Overview

- Cubital tunnel syndrome involves related anatomy, clinical presentation, and current management options [1].
- A subset of patients with cubital tunnel syndrome may benefit from earlier referral for hand surgery evaluation and earlier surgery [2].
- Patient-reported outcomes of surgical treatment for cubital tunnel syndrome are good but are affected by preoperative symptom severity [4].

- Surgery is effective in treating cubital tunnel syndrome, with more than 90% of patients cured or showing improvement [5].
- More rigorous scientific studies are needed to determine the most effective surgical approaches for cubital tunnel syndrome [6].
- A treatment algorithm has been proposed to provide clarity about the challenges of treating the complex patient population with cubital tunnel syndrome [7].
- There is currently no consensus on the best surgical treatment of cubital tunnel syndrome [8].
- Carpal tunnel and cubital tunnel syndrome requiring surgery is more common in deprived patients and occurs at an earlier age [12].
- Endoscopic cubital tunnel decompression has gained popularity, with early short-term results showing satisfactory outcomes and minimal complications [14].
- The selection of operative procedures for cubital tunnel syndrome is influenced by patient factors and surgeon preference, with most surgeons using more than one operative procedure [29].

Anatomy & Pathophysiology

- Definitions for the degree of ulnar nerve instability at the elbow are not uniformly agreed upon [28].
- With elbow flexion, the ulnar nerve did not move appreciably in the distal–proximal direction directly at the cubital tunnel [49].
- Maximal ulnar nerve excursion during elbow flexion occurs in the fatty region proximal to the elbow [49].
- The humeral trochlea protrudes into the cubital tunnel during elbow flexion, causing dynamic morphologic changes in the ulnar nerve [50].
- Tearing of the ulnar collateral ligament significantly increases elbow valgus laxity, which elongates the ulnar nerve during simulated throwing motion [51].
- Increased elbow flexion influences the intraneural blood flow of the ulnar nerve in patients with cubital tunnel syndrome [57].
- Exposure to lesser extraneural pressure by repetitive non-maximum elbow flexion might be more deleterious than maximum flexion pressure in cubital tunnel syndrome [55].
- Shoulder position changes the ulnar nerve strain around the elbow in living patients with cubital tunnel syndrome [56].
- The mechanism of symptom provocation by the elbow flexion test cannot be explained simply by dynamic pressure in the cubital tunnel, suggesting other pathophysiological factors contribute [58].
- Ulnar nerve gliding is most severe during passive wrist movement in elbow flexion and forearm supination [59].
- The study could not detect a definitive effect of elbow deformity (cubitus valgus/varus) on ulnar nerve strain or demonstrate the extent of acceptable clinical elbow deformity [61].

- The throwing elbow is a common source of nerve injuries due to the unique combination of anatomy, high forces, and sheer repetition associated with throwing sports [62].
- Dynamic ulnar nerve compression at the elbow due to the anconeus epitrochlearis muscle is an uncommon disorder with much remaining to be elucidated about its incidence and pathophysiologic mechanisms [64].

Classification

- Cubital tunnel syndrome is the most common form of entrapment of the ulnar nerve [18].
- Cubital tunnel syndrome is the second most common nerve compression syndrome of the upper extremity [18].
- Definitions for the degree of ulnar nerve instability at the elbow are not uniformly agreed upon [28].
- Further development of a classification system for ulnar nerve instability may be warranted to standardize treatment [28].
- High-resolution ultrasound (HRU) shows good correspondence to clinical and ENMG classifications in cubital tunnel syndrome [35].
- An intraoperative ulnar nerve subluxation classification system has promise in preventing adverse complications of ulnar nerve hypermobility after endoscopic cubital tunnel release [43].

Clinical Presentation

- Cubital tunnel syndrome is the most common form of entrapment of the ulnar nerve [18].
- Cubital tunnel syndrome is the second most common nerve compression syndrome of the upper extremity [18].
- Patients with cubital tunnel syndrome present earlier in the course of their disease than patients with carpal tunnel syndrome [3].
- Men with cubital tunnel syndrome are more likely to present with muscle atrophy than women [10].
- Carpal tunnel and cubital tunnel syndrome requiring surgery is more common in deprived patients and occurs at an earlier age [12].
- The majority of patients suffering from cubital tunnel syndrome with mild or moderate symptoms benefit from conservative treatment [20].
- Cubital tunnel syndrome in pediatric or adolescent patients is rare [19].
- Non-operative treatment of cubital tunnel syndrome in pediatric and adolescent patients is unlikely to resolve symptoms [22].
- There is no consensus reference standard for the diagnosis of Cubital Tunnel Syndrome [11].
- Provocative tests for Cubital Tunnel Syndrome have inadequate or inconsistent sensitivity and specificity [11].

- Diagnosis of Cubital Tunnel Syndrome should be discussed in terms of probabilities rather than certainties [11].
- Clinical evaluation is paramount in the diagnosis of cubital tunnel syndrome because electrodiagnostic testing often is not sufficiently sensitive to detect changes associated with the syndrome [17].
- Nearly forty percent of patients with a provisional diagnosis of Cubital Tunnel Syndrome had either another nerve pathology or a normal nerve conduction study [21].

Investigations

- Provocative tests for cubital tunnel syndrome have inadequate or inconsistent sensitivity and specificity [11].
- There is no consensus reference standard for the diagnosis of cubital tunnel syndrome [11].
- Diagnosis of cubital tunnel syndrome should be discussed in terms of probabilities rather than certainties [11].
- Electrodiagnostic testing is often not sufficiently sensitive to detect changes associated with cubital tunnel syndrome [17].
- Clinical evaluation is paramount in the diagnosis of cubital tunnel syndrome [17].
- Nearly forty percent of patients with a provisional diagnosis of cubital tunnel syndrome had either another nerve pathology or a normal nerve conduction study [21].
- Ulnar nerve cross-sectional area (CSA) measured by ultrasound is useful for the diagnosis of cubital tunnel syndrome [47].
- Ulnar nerve CSA measured by ultrasound is most significantly different between patients and controls at the medial epicondyle [47].
- Power Doppler ultrasound has high predictive value for severe cubital tunnel syndrome defined by axonal loss [54].
- MRI is an effective diagnostic modality for identifying primary synovial chondromatosis as a causative factor of cubital tunnel syndrome [38].
- Only a small number of individuals with MRI evidence of an anconeus epitrochlearis muscle (AEM) had clinical evidence of ulnar neuropathy [48].
- Cubital tunnel decompression is associated with prior trauma to the anatomic site [53].

Treatment

NON-OPERATIVE MANAGEMENT

- The majority of patients with mild or moderate cubital tunnel syndrome symptoms benefit from conservative treatment [20].
- Non-operative treatment is unlikely to resolve symptoms in pediatric and adolescent patients [22].

OPERATIVE MANAGEMENT: GENERAL PRINCIPLES AND SELECTION

- There is currently no consensus on the best surgical treatment for cubital tunnel syndrome [8].
- Most surgeons use more than one operative procedure for cubital tunnel syndrome, with selection influenced by patient factors and surgeon preference [29].
- Surgery is effective in treating cubital tunnel syndrome, with more than 90% of patients cured or showing improvement [5].
- None of the surgical techniques has demonstrated universal superiority above all others, but all appear to be effective [41].
- A subset of patients may benefit from earlier referral for hand surgery evaluation and earlier surgery [2].
- Reoperation after primary surgery provides satisfactory results for patients who fail conservative treatment [15].
- In situ decompression of the ulnar nerve is a reliable treatment with a low failure rate [40].

OPERATIVE TECHNIQUES: DECOMPRESSION

- Simple decompression with a small skin incision yielded satisfactory results in 14 of 18 elbows with no postoperative dislocation of the ulnar nerve [32].
- Endoscopic and open in situ decompression techniques demonstrate similar effectiveness, outcomes, complication profiles, and reoperation rates for idiopathic cubital tunnel syndrome [39].
- The patient-reported outcome of surgical treatment is good but is affected by preoperative symptom severity [4].

OPERATIVE TECHNIQUES: TRANSPOSITION AND OTHER PROCEDURES

- Both minimal medial epicondylectomy and anterior subcutaneous transposition can be used for cubital tunnel syndrome with a high rate of satisfaction [37].
- Medial epicondylectomy is recommended for patients with cubital tunnel syndrome associated with abnormal nerve-conduction velocity [33].
- The procedure offers complete release of constricting structures while preserving blood supply to the nerve and allowing early postoperative elbow mobilization [25].

OPERATIVE TECHNIQUES: SPECIALIZED AND COMBINED PROCEDURES

- Bony encasement of the ulnar nerve secondary to heterotopic ossification of the elbow is treated with an approach that leads to superior range of motion, improved or resolved ulnar neuropathy, and good to excellent long-term functional outcomes [26].
- Dual endoscopic carpal and cubital tunnel release is a safe and effective treatment option for patients with concurrent syndromes recalcitrant to nonsurgical management [36].

Complications

- Surgery was effective in treating cubital tunnel syndrome with more than 90% of patients cured or showing improvement [5].
- The short-term complication rates of cubital tunnel surgery are low (3.2%) [24].
- Short-term complication rates for cubital tunnel surgery are higher for patients with chronic kidney disease [24].
- Endoscopic cubital tunnel decompression shows satisfactory outcomes and minimal complications [14].
- Reoperation after primary surgery of cubital tunnel syndrome gave satisfactory results for patients who fail conservative treatment [15].
- Results of revision surgery for recurrent or persistent cubital tunnel syndrome are less predictable and satisfying than primary surgery [31].
- Poor outcomes and unnecessary revision surgeries for cubital tunnel syndrome can be avoided with intraoperative attention to 7 structures distal to the medial epicondyle [44].

Recovery

- Patients with carpal tunnel syndrome present earlier in the course of their disease than patients with cubital tunnel syndrome [3].
- A subset of patients with cubital tunnel syndrome may benefit from earlier referral for hand surgery evaluation and earlier surgery [2].
- The patient-reported outcome of surgical treatment of cubital tunnel syndrome is good but is affected by preoperative symptom severity [4].
- Surgery was effective in treating cubital tunnel syndrome with more than 90% of patients cured or showing improvement [5].
- Symptoms in an extra-ulnar distribution can resolve following cubital tunnel release [9].
- Reliable, reproducible, and valid outcomes measures are lacking from the surgical literature for cubital tunnel syndrome [13].
- Endoscopic cubital tunnel decompression shows satisfactory outcomes and minimal complications in early short-term results [14].
- Reoperation after primary surgery of cubital tunnel syndrome gave satisfactory results for patients who fail conservative treatment [15].
- The short-term complication rates of cubital tunnel surgery are low (3.2%), but higher for patients with chronic kidney disease [24].
- Treatment of 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 [26].

- There are no significant differences in long-term outcomes after open and retractor-endoscopic in situ decompression of the ulnar nerve in cubital tunnel syndrome [30].
- Results of revision surgery for recurrent or persistent cubital tunnel syndrome are less predictable and satisfying than primary surgery [31].
- Patients with an anomalous muscle (AE) experience quicker symptom improvement after cubital tunnel release than those without the anomalous muscle [34].

Key Evidence

- [L5] This article reviews related anatomy, clinical presentation, and current management options for cubital tunnel syndrome with an emphasis on contemporary outcomes research. (10.1016/j.jhsa.2015.03.011)
- [L3] A subset of patients with cubital tunnel syndrome may benefit from earlier referral for hand surgery evaluation and earlier surgery. (10.1177/15589447211058821)
- [L4] Patients with carpal tunnel syndrome present earlier in the course of their disease than patients with cubital tunnel syndrome. (10.1016/j.jhsa.2007.03.009)
- [L3] The patient-reported outcome of surgical treatment of cubital tunnel syndrome is good but is affected by preoperative symptom severity. (10.1016/j.jhsa.2009.05.014)
- [L4] Surgery was effective in treating cubital tunnel syndrome with more than 90% of patients cured or showing improvement. (10.1016/j.otsr.2014.03.009)
- [L4] More rigorous scientific studies are needed to determine the most effective surgical approaches for cubital tunnel syndrome. (10.1007/s12178-020-09650-y)
- [L4] The purpose of this review is to summarize the most up-to-date literature regarding cubital tunnel syndrome and propose a treatment algorithm to provide clarity about the challenges of treating this complex patient population. (10.1016/j.jhsg.2022.07.008)
- [L5] There is currently no consensus on the best surgical treatment of cubital tunnel syndrome. (10.1016/j.ocl.2012.07.017)
- [L3] This study documents resolution of symptoms in an extra-ulnar distribution after cubital tunnel release. (10.1007/s11552-014-9688-9)
- [L4] Men with cubital tunnel syndrome are more likely to present with muscle atrophy than women. (10.1177/1558944716643096)
- [L4] There is no consensus reference standard for the diagnosis of Cubital Tunnel Syndrome, and provocative tests have inadequate or inconsistent sensitivity and specificity; diagnosis should be discussed in terms of probabilities rather than certainties. (10.1016/j.jhsa.2011.03.021)
- [L4] Carpal tunnel and cubital tunnel syndrome requiring surgery is more common in deprived patients and occurs at an earlier age. (10.1177/1753193420939384)
- [L3] Reliable, reproducible, and valid outcomes measures are lacking from the surgical literature for cubital tunnel syndrome. (10.1016/j.jhsa.2009.05.010)

- [L5] Endoscopic cubital tunnel decompression has gained popularity with early short-term results being encouraging, showing satisfactory outcomes and minimal complications. (10.1136/jisakos-2020-000506)
- [L4] Clinical evaluation is paramount in the diagnosis of cubital tunnel syndrome because electrodiagnostic testing often is not sufficiently sensitive to detect changes associated with the syndrome. (10.1016/j.hcl.2013.08.019)
- [L5] Cubital tunnel syndrome is the most common form of entrapment of the ulnar nerve and the second most common nerve compression syndrome of the upper extremity. (10.1016/s0749-0712(21)00356-5)
- [L3] Cubital tunnel syndrome in pediatric or adolescent patients is rare and can be treated successfully with surgical intervention. (10.1016/j.jhsa.2012.01.016)
- [L2] The majority of patients suffering from cubital tunnel syndrome with mild or moderate symptoms benefit from conservative treatment. (10.1177/1753193408098480)
- [L4] Nearly forty percent of patients with a provisional diagnosis of CubTS had either another nerve pathology or a normal test. (10.1016/j.jse.2020.01.064)
- [L4] Non-operative treatment of cubital tunnel syndrome in pediatric and adolescent patients is unlikely to resolve symptoms. (10.1016/s0363-5023(11)60063-4)
- [L4] The short-term complication rates of cubital tunnel surgery are low (3.2%), but higher for patients with chronic kidney disease. (10.1016/j.jhsa.2017.01.020)
- [L5] The procedure offers complete release of constricting structures while preserving blood supply to the nerve and allowing early postoperative elbow mobilization. (10.1016/s0749-0712(21)00325-5)
- [L4] This treatment approach leads to superior range of motion, improved or resolved ulnar neuropathy, and good to excellent long-term functional outcomes. (10.1016/j.jse.2023.12.003)
- [L4] Most surgeons use more than one operative procedure in their treatment of patients with cubital tunnel syndrome and the selection of the operative procedure is influenced by patient factors and surgeon preference. (10.1007/s11552-008-9133-z)
- [L3] There are no significant differences in long-term outcomes after open and retractor-endoscopic in situ decompression of the ulnar nerve in cubital tunnel syndrome. (10.1227/neu.0b013e3182846dbd)
- [L4] Results of revision surgery for recurrent or persistent cubital tunnel syndrome are less predictable and satisfying than primary surgery. (10.1016/j.jhsa.2011.11.024)
- [L4] The technique yielded satisfactory results in 14 of 18 elbows with no postoperative dislocation of the ulnar nerve. (10.1054/jhsb.2002.0821)
- [L4] The procedure is recommended for patients with cubital tunnel syndrome associated with abnormal nerve-conduction velocity. (10.2106/00004623-198062060-00016)
- [L3] Patients with an AE experience quicker symptom improvement after cubital tunnel release than those without the anomalous muscle. (10.1016/j.jhsa.2017.06.033)
- [L4] HRU proved to be an effective diagnostic tool for cubital tunnel syndrome and its etiologies, showing good correspondence to clinical and ENMG classifications. (10.1016/j.otsr.2014.03.008)

- [L4] Preliminary data demonstrate that dual endoscopic carpal and cubital tunnel release is a safe and effective treatment option for patients who present with concurrent cubital and carpal tunnel syndromes recalcitrant to nonsurgical management. (10.1007/s11552-013-9552-3)
- [L3] Both methods can be used for the treatment of cubital tunnel syndrome with a high rate of satisfaction. (10.1016/j.jse.2005.10.007)
- [Case_report] MRI is an effective diagnostic modality, and clinicians should be aware of primary synovial chondromatosis as a causative factor of cubital tunnel syndrome. (10.1177/1758573216683396)
- [L1] The current study demonstrates similar effectiveness between the endoscopic (ECTuR) and open (OCTuR) techniques for treatment of idiopathic cubital tunnel syndrome with similar outcomes, complication profiles, and reoperation rates. (10.1177/1558944715616097)
- [L4] In situ decompression of the ulnar nerve is a reliable treatment for cubital tunnel syndrome with a low failure rate. (10.1177/1753193408101467)
- [L4] None of the techniques in this review has demonstrated universal superiority above all others, but all appear to be effective in the treatment of cubital tunnel syndrome. (10.3389/fsurg.2018.00048)
- [L4] Our preliminary report of patients shows satisfactory outcomes, which suggests that our intraoperative ulnar nerve subluxation classification system has promise in preventing adverse complications of ulnar nerve hypermobility after endoscopic cubital tunnel release. (10.1016/j.jhsg.2020.05.001)
- [L5] Poor outcomes and unnecessary revision surgeries for cubital tunnel syndrome can be avoided with intraoperative attention to 7 structures distal to the medial epicondyle. (10.1177/1558944718771390)
- [L1] The ulnar nerve CSA measured by US imaging is useful for the diagnosis of cubital tunnel syndrome (CuTS), and is most significantly different between patients and controls at the medial epicondyle. (10.1016/j.apmr.2017.08.467)
- [L4] Only a small number of individuals with MRI evidence of an AEM had clinical evidence of ulnar neuropathy. (10.1016/j.jse.2018.03.021)
- [L5] With elbow flexion, the ulnar nerve did not move appreciably in the distal–proximal direction directly at the cubital tunnel, but maximal excursion was in the fatty region proximal to the elbow. (10.1016/j.jhsa.2012.03.016)
- [L5] The humeral trochlea protrudes into the cubital tunnel during elbow flexion, causing dynamic morphologic changes in the ulnar nerve. (10.1016/j.jse.2022.05.026)
- [L5] Tearing of the UCL significantly increased elbow valgus laxity, which in turn elongated the ulnar nerve during simulated throwing motion. (10.1016/j.jse.2019.02.009)
- [L4] Cubital tunnel decompression is associated with prior trauma to the anatomic site. (10.1016/j.jhsa.2017.07.009)
- [L3] Power Doppler ultrasound demonstrated high predictive value for severe cubital tunnel syndrome defined by axonal loss. (10.1177/15589447221127334)
- [L4] The increased pressure in the cubital tunnel could still be important, as exposure to a lesser extraneural pressure by repetitive non-maximum elbow flexion might be more deleterious. (10.3109/2000656x.2012.747962)

- [L4] To the best of our knowledge, this is the first study showing that shoulder position changes the ulnar nerve strain around the elbow in living patients with CubTS. (10.1016/j.jse.2015.01.014)
- [L3] Increased elbow flexion in patients with CuTS influences the intraneural blood flow of the ulnar nerve. (10.1016/j.jhsa.2021.06.024)
- [L3] The mechanism of provocation of symptoms of cubital tunnel syndrome by the elbow flexion test could not be explained simply by dynamic pressure in the cubital tunnel, and other pathophysiological factors could also be contributing. (10.1016/j.jhsa.2010.11.013)
- [L4] Ulnar nerve gliding was most severe during passive wrist movement in elbow flexion and forearm supination. (10.5397/cise.2024.00934)
- [L5] The study could not detect a definitive effect of elbow deformity on ulnar nerve strain or demonstrate the extent of acceptable clinical elbow deformity. (10.1186/s12891-022-05786-9)
- [L5] The throwing elbow is a common source of nerve injuries due to the unique combination of anatomy, high forces, and sheer repetition associated with throwing sports. (10.1016/j.csm.2004.04.012)
- [L4] Dynamic ulnar nerve compression at the elbow due to the anconeus epitrochlearis muscle is an uncommon, little-known disorder with much remaining to be elucidated about its incidence and pathophysiologic mechanisms. (10.1016/j.jhsg.2022.11.002)

References

[1] The Management of Cubital Tunnel Syndrome. *The Journal of Hand Surgery*. 2015. DOI: 10.1016/j.jhsa.2015.03.011 [2] Factors Associated With Severity of Cubital Tunnel Syndrome at Presentation. *HAND*. 2021. DOI: 10.1177/15589447211058821 [3] Muscle Atrophy at Diagnosis of Carpal and Cubital Tunnel Syndrome. *The Journal of Hand Surgery*. 2007. DOI: 10.1016/j.jhsa.2007.03.009 [4] Patient-Rated Outcome of Ulnar Nerve Decompression: A Comparison of Endoscopic and Open In Situ Decompression. *The Journal of Hand Surgery*. 2009. DOI: 10.1016/j.jhsa.2009.05.014 [5] Cubital tunnel syndrome: Comparative results of a multicenter study of 4 surgical techniques with a mean follow-up of 92 months. *Orthopaedics & Traumatology: Surgery & Research*. 2014. DOI: 10.1016/j.otsr.2014.03.009 [6] Cubital Tunnel Syndrome: Current Concepts. *Current Reviews in Musculoskeletal Medicine*. 2020. DOI: 10.1007/s12178-020-09650-y [7] Modern Treatment of Cubital Tunnel Syndrome: Evidence and Controversy. *Journal of Hand Surgery Global Online*. 2023. DOI: 10.1016/j.jhsg.2022.07.008 [8] Cubital Tunnel Syndrome. *Orthopedic Clinics of North America*. 2012. DOI: 10.1016/j.ocl.2012.07.017 [9] Prospective Cohort Study of Symptom Resolution outside of the Ulnar Nerve Distribution following Cubital Tunnel Release. *HAND*. 2014. DOI: 10.1007/s11552-014-9688-9 [10] Muscle Atrophy at Presentation of Cubital Tunnel Syndrome. *HAND*. 2016. DOI: 10.1177/1558944716643096 [11] Diagnosis of Cubital Tunnel Syndrome. *The Journal of Hand Surgery*. 2011. DOI: 10.1016/j.jhsa.2011.03.021 [12] The effect of social deprivation on the incidence rate of carpal and cubital tunnel syndrome surgery. *Journal of Hand Surgery (European Volume)*. 2020. DOI: 10.1177/1753193420939384 [13] Outcomes Measures Used to Assess Results After Surgery for Cubital Tunnel Syndrome: A Systematic Review of the Literature. *The Journal of Hand Surgery*. 2009. DOI: 10.1016/j.jhsa.2009.05.010 [14] Endoscopic cubital tunnel decompression: state of the art. *Journal of ISAKOS*. 2021. DOI: 10.1136/jisakos-2020-000506 [15] 10.1055-s-2001-19937. 2001. [17] Minimal-Incision In Situ Ulnar Nerve Decompression at the Elbow. *Hand*

Clinics. 2014. DOI: 10.1016/j.hcl.2013.08.019 [18] CUBITAL TUNNEL SYNDROME AND THE PAINFUL UPPER EXTREMITY. *Hand Clinics*. 1996. DOI: 10.1016/s0749-0712(21)00356-5 [19] Surgical and Nonsurgical Treatment of Cubital Tunnel Syndrome in Pediatric and Adolescent Patients. *The Journal of Hand Surgery*. 2012. DOI: 10.1016/j.jhsa.2012.01.016 [20] Conservative Treatment of the Cubital Tunnel Syndrome. *Journal of Hand Surgery (European Volume)*. 2009. DOI: 10.1177/1753193408098480 [21] Nerve Conduction Study Results for Suspected Cubital Tunnel Syndrome. *Journal of Shoulder and Elbow Surgery*. 2020. DOI: 10.1016/j.jse.2020.01.064 [22] Surgical Outcomes of Cubital Tunnel Syndrome in Pediatric and Adolescent Patients. *The Journal of Hand Surgery*. 2011. DOI: 10.1016/s0363-5023(11)60063-4 [24] Rates of Complications and Secondary Surgeries After In Situ Cubital Tunnel Release Compared With Ulnar Nerve Transposition: A Retrospective Review. *The Journal of Hand Surgery*. 2017. DOI: 10.1016/j.jhsa.2017.01.020 [25] CUBITAL TUNNEL SYNDROME. *Hand Clinics*. 1996. DOI: 10.1016/s0749-0712(21)00325-5 [26] 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 [28] 10.1055-s-0038-1665548. n.d.. [29] Selection of Operative Procedures for Cubital Tunnel Syndrome. *HAND*. 2008. DOI: 10.1007/s11552-008-9133-z [30] Open vs Retractor-Endoscopic In Situ Decompression of the Ulnar Nerve in Cubital Tunnel Syndrome. *Neurosurgery*. 2013. DOI: 10.1227/neu.0b013e3182846dbd [31] Recurrent or Persistent Cubital Tunnel Syndrome. *The Journal of Hand Surgery*. 2012. DOI: 10.1016/j.jhsa.2011.11.024 [32] Simple Decompression with Small Skin Incision for Cubital Tunnel Syndrome. *Journal of Hand Surgery*. 2002. DOI: 10.1054/jhsb.2002.0821 [33] Cubital tunnel syndrome. Treatment by medial epicondylectomy.. *The Journal of Bone & Joint Surgery*. 1980. DOI: 10.2106/00004623-198062060-00016 [34] Simultaneous Bilateral Carpal and Cubital Tunnel Releases. *The Journal of Hand Surgery*. 2017. DOI: 10.1016/j.jhsa.2017.06.033 [35] Contribution of static and dynamic ultrasound in cubital tunnel syndrome. *Orthopaedics & Traumatology: Surgery & Research*. 2014. DOI: 10.1016/j.otsr.2014.03.008 [36] Concomitant Endoscopic Carpal and Cubital Tunnel Release: Safety and Efficacy. *HAND*. 2013. DOI: 10.1007/s11552-013-9552-3 [37] Comparative study between minimal medial epicondylectomy and anterior subcutaneous transposition of the ulnar nerve for cubital tunnel syndrome. *Journal of Shoulder and Elbow Surgery*. 2006. DOI: 10.1016/j.jse.2005.10.007 [38] Ulnar nerve palsy caused by synovial protrusion in synovial chondromatosis of the elbow: a case report and literature review. *Shoulder & Elbow*. 2016. DOI: 10.1177/1758573216683396 [39] Endoscopic Versus Open Cubital Tunnel Release. *HAND*. 2016. DOI: 10.1177/1558944715616097 [40] Incidence of Re-Operation and Subjective Outcome Following in Situ Decompression of the Ulnar Nerve at the Cubital Tunnel. *Journal of Hand Surgery (European Volume)*. 2009. DOI: 10.1177/1753193408101467 [41] Surgical Approaches and Their Outcomes in the Treatment of Cubital Tunnel Syndrome. *Frontiers in Surgery*. 2018. DOI: 10.3389/fsurg.2018.00048 [43] Classification and Treatment of Ulnar Nerve Subluxation Following Endoscopic Cubital Tunnel Release. *Journal of Hand Surgery Global Online*. 2020. DOI: 10.1016/j.jhsg.2020.05.001 [44] The 7 Structures Distal to the Elbow That Are Critical to Successful Anterior Transposition of the Ulnar Nerve. *HAND*. 2018. DOI: 10.1177/1558944718771390 [47] Ulnar Nerve Cross-Sectional Area for the Diagnosis of Cubital Tunnel Syndrome: A Meta-Analysis of Ultrasonographic Measurements. *Archives of Physical Medicine and Rehabilitation*. 2018. DOI: 10.1016/j.apmr.2017.08.467 [48] Quantitative magnetic resonance imaging analysis of the cross-sectional areas of the anconeus epitrochlearis muscle, cubital tunnel, and ulnar nerve with the elbow in extension in patients with and without ulnar neuropathy. *Journal of Shoulder and Elbow Surgery*. 2018. DOI: 10.1016/j.jse.2018.03.021 [49] Laxity of the Ulnar Nerve During Elbow Flexion and Extension. *The Journal of Hand Surgery*. 2012. DOI: 10.1016/j.jhsa.2012.03.016 [50] Dynamic analysis of the ulnar nerve

and cubital tunnel morphology using ultrasonography: a cadaveric study. *Journal of Shoulder and Elbow Surgery*. 2022. DOI: 10.1016/j.jse.2022.05.026 [51] Ulnar collateral ligament insufficiency affects cubital tunnel syndrome during throwing motion: a cadaveric biomechanical study. *Journal of Shoulder and Elbow Surgery*. 2019. DOI: 10.1016/j.jse.2019.02.009 [53] Surgical Demographics of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome Over 5 Years at a Single Institution. *The Journal of Hand Surgery*. 2017. DOI: 10.1016/j.jhsa.2017.07.009 [54] Gray-Scale and Power Doppler Ultrasound Findings Predictive of Cubital Tunnel Syndrome Severity. *HAND*. 2022. DOI: 10.1177/15589447221127334 [55] Association between the disease severity and extraneural pressure induced by maximum elbow flexion in patients with cubital tunnel syndrome. *Journal of Plastic Surgery and Hand Surgery*. 2013. DOI: 10.3109/2000656x.2012.747962 [56] Shoulder position increases ulnar nerve strain at the elbow of patients with cubital tunnel syndrome. *Journal of Shoulder and Elbow Surgery*. 2015. DOI: 10.1016/j.jse.2015.01.014 [57] Dynamic Evaluation of Intraneural Microvascularity of the Ulnar Nerve Using Contrast-Enhanced Ultrasonography in Patients With Cubital Tunnel Syndrome. *The Journal of Hand Surgery*. 2022. DOI: 10.1016/j.jhsa.2021.06.024 [58] Association Between the Elbow Flexion Test and Extraneural Pressure Inside the Cubital Tunnel. *The Journal of Hand Surgery*. 2011. DOI: 10.1016/j.jhsa.2010.11.013 [59] Biomechanical analysis of ulnar nerve gliding and elongation: implications for nonsurgical ulnar nerve release in cubital tunnel syndrome. *Clinics in Shoulder and Elbow*. 2025. DOI: 10.5397/cise.2024.00934 [61] A cadaveric study of ulnar nerve strain at the elbow associated with cubitus valgus/varus deformity. *BMC Musculoskeletal Disorders*. 2022. DOI: 10.1186/s12891-022-05786-9 [62] Nerve injuries in the throwing elbow. *Clinics in Sports Medicine*. 2004. DOI: 10.1016/j.csm.2004.04.012 [64] Dynamic Compression of the Ulnar Nerve Associated With the Anconeus Epitrochlearis Muscle: Do We Really Know Everything?. *Journal of Hand Surgery Global Online*. 2023. DOI: 10.1016/j.jhsg.2022.11.002

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