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Review Article

Orthopaedics Section

Treatment of the Cubital Tunnel Syndrome of the Ulnar Nerve in the Elbow Area: A Review Article

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ABSTRACT

The common neuropathy Cubital Tunnel Syndrome (CuTS) causes sensory impairment. Numerous patients also exhibit muscle atrophy as a symptom of severe and persistent nerve damage, which typically portends a poor prognosis. In the majority of individuals with minor nerve dysfunction, nonsurgical treatment aimed at reducing both compression and traction on the ulnar nerve at the elbow is successful. The optimum care for a patient with this pathology requires prompt and accurate evaluation, diagnosis, and testing, as well as evidence-based therapy choices. The goal of this review article was to offer an updated summary of the most recent research on the results of several surgical procedures for CuTS. A clinician must use the available information to develop a diagnosis and treatment plan that are unique to the patient. The most effective surgical methods for CuTS need to be discovered through more in-depth scientific investigation.

Keywords: Cubital tunnel release, Denervation, Neuropathy, Ulnar nerve compression, Ulnar nerve transposition, Ulnar neuropathy

INTRODUCTION

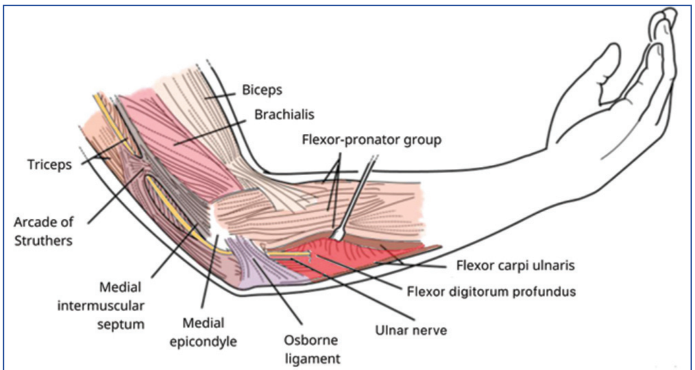
Treatment for "CuTS" also known as the ulnar nerve in the elbow, is difficult. Examining multiple factors, including a physical examination and laboratory tests, is necessary for a diagnosis that can aid in treatment. Because this information influences how the treatment is chosen, it is crucial to carefully evaluate the patient's medical history, the efficacy of the examination methods, and the diagnostic tools employed. Non operative treatment must be carefully considered and is based on the individual patient's features. Which surgical techniques are performed and which ones are selected should depend on the patient's symptoms and their severity.

Epidemiology

The CuTS is the second most prevalent peripheral entrapment neuropathy in the elbow, after Carpal Tunnel Syndrome (CTS) [1]. CTS is caused by compression of the median nerve within the carpal tunnel and is the most prevalent peripheral nerve entrapment disease. The prevalence of CTS has been reported to be around 5% in the general population [2]. With 25 instances per 100,000 people, per year in males and 19 cases per 100,000 people, per year in females [3], patients with CuTS are more likely to receive treatment than those with CTS [4], but if they delay diagnosis, they risk developing ulnar nerve disorders in their fingers, which can result in chronic symptoms, permanent loss of sensation, muscle weakness, and trigger finger. Therefore, in individuals with nerve problems, prompt surgical treatment is crucial. The surgery rate for CuTS has increased over the past few decades in both the United States and England, going from 31% to 67% in the former [2].

Anatomy

There are multiple compression locations for the ulnar nerve in the inner elbow [Table/Fig-1]. The Arcade of Stuthers is typically the first place to be discovered. It is located between the enlarged head tricep tissue and the intermuscular septum, which is 6 to 10 cm away from the medial epicondyle. An 86.7% of the Arcade of Struthers was discovered in a study on the principal's body by Tubbs RS et al., [5]. The Osborne ligament protects the region behind the medial epicondyle, where ulnar nerve entrapment is most frequently encountered. This is the second most typical site for this condition. The humeral head of the Flexor Carpi Ulnaris (FCU) leans on the olecranon and FCU heads, and the osborne ligament originates in the medial epicondyle region. The osborne ligament typically measures 0.14 mm thick, 2.2 cm long [6], and has three layers of tissue that are created by the elastic retinaculum and myofascial laminar fibers [7]. The mobility of the ulnar nerve during the elbow's bending and stretching ranges may be decreased by the pathological fusion of these layers [7]. As a result, the tunnel's form shifts from oval to trapezoidal and its cross-sectional area drops by 30% to 41% during elbow bending [8]. The two heads of FCU, the epitrochleoanconeus muscles, and the Flexor Digitorum Superficialis (FDS) muscles are other sources of ulnar nerve compression [7].



[Table/Fig-1]: Ulnar nerve at the elbow with potential compressive structures.

Patient Presentation

Patients with early stage CuTS typically exhibit front and back palm numbness, diminished sensation in the ring or little fingers, and these symptoms appear on the dorsoulnar side. These symptoms typically appear at night and can be brought on by activities like using a cell phone or bending the elbow for an extended period of time, as well as during work or leisure time. Patients who wait until the last minute to visit the doctor may develop a chronic condition that makes it difficult to use their hands normally for tasks like picking things up [9].

Physical Examination

Observing the internal hand muscles and the ring and little finger symptoms is the first step in a physical evaluation of a patient with

CuTS [10]. In the event of persistent and severe symptoms, atrophy of the hand muscles between the thumb and index finger on the back of the hand (first dorsal interosseous muscle) may be instantly apparent [Table/Fig-1]. A physical examination should be performed to distinguish between the two points of the finger, which are the ring and little fingers and test and rate the function of the hand's internal muscles (two point discrimination). The little and ring fingers will exhibit sensory loss upon physical examination. The most prevalent type of atrophy in backhanded muscles is that of the first dorsal interosseous muscle. Because the third palmar interosseous membrane is weak, the Wartenberg sign yields a positive result [11]. When the patient tries to turn the key and the joint between the thumb joints bends, it is known as a Froment sign [12] because the flexor pollicis longus muscle is attempting to make up for the pollicis adductor muscle's weakness.

By palpating the ulnar nerve, which is situated behind the medial epicondyle, the ulnar nerve should be investigated. By bending the elbow and palpating along the nerve's course while checking for movement away from the ulnar groove, the ulnar nerve should be checked for subluxation or hypermobility. The ulnar nerves of the patient may get irritated during the physical examination using provocative testing. The procedure for the evaluation involves percussion on the nerves in the retrocondylar groove while the elbow is bent fully and the wrist is extended [13]. The ulnar nerve may make a noise that extends along the forearm's edge into the hand and toward the ring and little fingers, giving Tinel's tests in this location gives favourable results. The flexion compression test involves bending the elbow and applying pressure to the ulnar nerve region in the rear of the medial epicondyle. The tip of the hand, the ring fingers, and the tiny fingers will be numb if the test is positive.

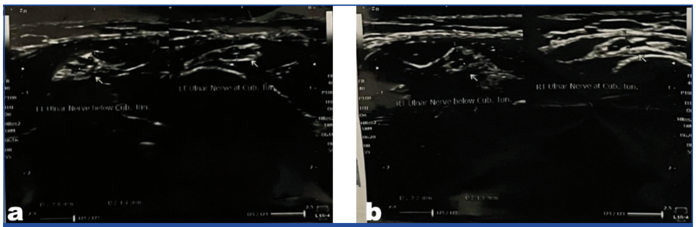
Diagnostic Evaluation

Electromyography (EMG), ultrasonography, and Magnetic Resonance Imaging (MRI) can all aid in the diagnosis of nerve fiber function when ulnar entrapment neuropathy is aggravated or chronic in CuTS patients. These diagnostic procedures should be used to confirm the diagnosis made by a history and physical examination on the course of ulnar nerve degeneration at the cubital tunnel.

Electromyography (EMG): A test called EMG is performed to assess the electrical output of the muscles. When a patient is experiencing neuron ischaemia in its early phases, EMG tests may come back negative. The quickest nerve fibers' nerve conduction velocity has not yet slowed down as a result of the compression neuropathy of the ulnar nerve and the impact of a reduction in blood flow to the peripheral nerve [14]. EMG examinations reveal anomalies in the transmission of the ulnar nerve (ulnar) as aggravation of CuTS continues to atrophy myelin (demyelination) [15]. Greater CuTS severity or continued pressure will result in axon damage [14]. After this process, the EMG test results reveal further information about the conductivity of the nerve currents, where slower conductivity of nerve currents is beneficial to validate the location and gauge the severity of peripheral entrapment neuropathy. According to the American Association of neuromuscular and electrodiagnostic medicine's executive summary, CuTS can be identified when the nerve conduction velocity in the elbow is less than 50 m/s or when the nerve conduction velocity from above to below the elbow is slower than the nerve conduction velocity from the elbow to the wrist is more than 10 m/s [16].

Ultrasound: The size of the nerves can be evaluated with the aid of ultrasound. In the modern era, ultrasound has improved resolution, effectiveness, and specificity in CuTS diagnosis. Recent EMG results for CuTS patients in the study were normal [Table/Fig-2a,b], but ultrasound revealed an increased cross-sectional area of a bigger nerve [17], which is where the entrapment neuropathy is located.

In the patient population with CuTS, ultrasound can show the site of the entrapment neuropathy and the magnification of the cross-sectional area [18]. Increased patient comfort and time savings are two benefits of ultrasonography [19]. Chang KV et al., reported that the ulnar nerve Cross-Sectional Area (CSA) measured by ultrasound imaging is useful for the diagnosis of CuTS and is most significantly different between participants without CuTS at the medial epicondyle [19]. However, ultrasonography tests are unable to offer useful data to evaluate the conductivity of nerve currents. The ulnar nerve was investigated in a study that compared the CSA of the ulnar nerve between individuals with CuTS and the control group. According to ultrasound findings, patients with symptoms had an ulnar nerve with a higher average CSA than those without symptoms (0.19 cm^2 in the CuTS group vs. 0.065 cm^2 in the control group) [20]. It displays a statistically significant difference in the compressed size of the ulnar nerve [20]. Similar research by Mezian K et al., revealed that the maximal CSA, which was measured by the ulnar nerve's dilatation near the elbow, was 14.6 mm^2 in individuals with CuTS and only 7.1 mm^2 in the control group [21]. Patients with less severe symptoms, like demyelination, had an average CSA of 11.1 mm^2, compared to 18.3 mm^2 for those with axonal loss [21].



[Table/Fig-2]: Left ulnar nerve cross-sectional area of a bigger nerve.

Magnetic Resonance Imaging (MRI): Techniques for MRI imaging can be used to evaluate CuTS symptoms. MRI is helpful in determining the specifics of the compression and determining the nature, extent, and location of lesions [21]. In a study comparing MRI and EMG examinations, it was discovered that MRI was 25% more effective at detecting CuTS than EMG [18]. High signal intensity and nerve dilatation were the most frequent MRI results (63%), followed by entrapment neuropathy (27%), high signal intensity alone (23%), and nerve dilatation alone (2%) [22]. This investigation discovered, however, that the MRI impact was unable to indicate the disease's severity. This means that while it may be useful to confirm the diagnosis, it is not used to determine the prognosis.

Differential Diagnosis

Entrapment neuropathy (C8-T1, radicular compression) on the neck, compression neuropathy of the ulnar nerve, guyon area on the wrist, inflammation of the inner adhesion of the medial epicondylitis elbow, or glenohumeral osteoarthritis can all induce numbness in the inner hand. Additionally, this needs to be done in order to isolate these diseases.

Classification

The severity of CuTS has been classified by Dellon AL and McGowan AJ into three categories: type 1 (Dellon type 1, McGowan type 1), a minor condition in which the patient would simply experience numbness without losing two points of differentiation [23,24]. Patients with McGowan type 2A or Dellon type 2 syndrome are characterised by a weakness of the picking and grasping muscles without muscle atrophy. Patients with McGowan type 2B showed intrinsic muscle 3 atrophy and strength. Patients with severe CuTS, also known as McGowan type 3 or Dellon type 3, exhibit symptoms such as muscle atrophy, loss of sensation, and weakness in the fingers, making it impossible to cross the fingers [Table/Fig-3,4].

Non Operative Treatment

Depending on the speed at which the motor's nerve impulses are conducted, patients with mild CuTS can receive conservative treatment. at the elbow: >40 m/s [14]. In a research by the University of Washington School of Medicine, 53,401 patients with

• Type 1	• Subjective sensory symptons without objective loss of two-point sensibility or muscular atrophy
• Type 2A	• Sensory symptoms+weakness on pinch and grip without atrophy
• Type 2B	• Sensory symptoms+atrophy and intrinsic muscle strength ≤3
• Type 3	• Profound muscular atrophy and sensory distrubance

[Table/Fig-3]: McGowan grading system and to determine its ability to distinguish the severity of Cubital Tunnel Syndrome (CuTS).

	Mild (I)	Moderate (II)	Severe (III)
Sensory	Intermittent paresthesia	Intermittent paresthesia	Permanent paresthesia
Motor	Subjective weakness	Measurable weakness	Palsy

[Table/Fig-4]: Dellon's classification of Cubital Tunnel Syndrome (CuTS) [23].

CuTS received non operative care, making up 58.7% of the patients [25]. Similarly, Speach DP et al., discovered that relief treatment is linked to an increase in the nerve conduction velocity at the elbow, and that around half of the patients with improved symptoms with conservative care [26].

For patients, there are numerous non operative therapeutic options, dealing with elbow bending at night by placing a splint for three to six months or wrapping a soft towel around the elbow. These can also lessen the signs and symptoms of CuTS [27]. The non steroidal anti-inflammatory drugs medication class can stop the symptoms from getting worse, while wrist splints lessen the ulnar nerve's straining in the Guyon canal. CuTS symptoms are lessened with stretching therapy and arm, hand, and elbow strengthening exercises. The symptoms will also improve if the workout is changed to require less force to bend the elbow for a prolonged period of time.

According to Shah CM et al., 88% of patients with mild or moderate deltoid type 1 or 2 CuTS responded to activity adjustments and the use of stiff nighttime splints [27]. A 90% of the patients with mild to moderate CuTS, according to Svernlöv's research [28], showed improvement in their symptoms after non operative care. A 10% of the individuals in that study had surgery six months earlier. According to Dellon's calculation [29], those who have mild CuTS are 21% more likely to require surgery. Surgery is 33% likely for individuals with mild symptoms, while surgery is 66% likely for people with severe symptoms, in order to get satisfactory results [29]. Patients with minor CuTS typically receive non operative treatment, according to the study [29].

Surgical Treatment

Surgery decision-making is a complicated process that depends on a variety of variables. These variables include the disease's severity, the findings of the physical examination, the patient's medical history, and the success or failure of conservative therapies. In general, the surgery's purpose is to release pressure on the ulnar nerve at the elbow [9]. There are generally two surgical methods: 1) Ulnar nerve release while keeping the regular anatomical nerve in place; 2) Release the ulnar nerve and reposition the nerve small incision seems to be more recommendable than anterior subcutaneous transposition of the ulnar nerve for cubital tunnel syndrome in terms of its simplicity and lesser invasiveness.

Cubital Tunnel Release In-situ, Simple Decompression [30]

Open surgery is used in this technique to maintain the normal course of the back nerve of the medial epicondyle while extending the nerve's walking route or simple decompression, the point where all pressure is applied along the nerve line. The laparoscopic surgery can be done with an incision as small as 2 cm, whereas the open wound surgery technique requires a 6 cm incision between the medial epicondyle and the olecranon [31]. In the distal fascia medial triceps segment, the Osborne ligament and fascia fibrosis of the FCU are surgically treated, while the intermuscular septum is surgically treated in the proximal region. Expanding solely on the spot approaches are also used, but with smaller lesions. The available data does not conclusively show which of these two strategies produces better results [32]. According to statistics, laparoscopic procedures had a 92.0% success rate compared to 82.7% for open procedures, and patients who underwent laparoscopic procedures had less problems [32].

No appreciable changes in the results of muscle weakening and numbness were discovered in meta-analysis studies comparing the two approaches [33]. Nevertheless, the same study found considerable variations in laparoscopic surgery's scar size and reduced elbow discomfort [33]. There was no statistically significant difference between the straightforward decompression method and the transposition method in meta-analysis studies [9,34,35]. Simple decompression is inappropriate for hypermobile nerves. In this patient population, the majority of surgeons advise performing transposition or medial epondylectomy with osteoplasty more frequently [36,37]. In patients with stable ulnar nerves, simple decompression surgery is reasonable and effective, but it is also linked to a higher rate of early recurrence. As opposed to anterior transposition or medial epicondylectomy surgery, this needs to be corrected [38].

Endoscopic Procedures

Tsai TM et al., published the first description of endoscopic help for CuTS surgery in 1995 [39], using moon-shaped wounds with a diameter of 5 mm in the center of the epicondyle and the olecranon to release the perched fibrosis tissue. By using endoscopy and relaxing tissue that is pressing on the nerves up to 10 cm in both near and peripheral directions from the insertion location, this technique makes it possible to visualise the nerves as they travel along their course [39]. With 13 single-technique studies found, the usage of endoscopic techniques was explored more completely than open surgical procedures. The largest single technical study of the endoscopic technique involved 172 procedures on 148 patients, with [40] of them demonstrating remarkably good outcomes with 96% Combined Good and Excellent (CGE) outcomes (B), with a complication rate of only 4% (n=7), and four wounds, two cellulitis, and one self-limiting postoperative blood transfusion.

A series of 85 surgeries in 76 patients, showing 87% (B) CGE, were published by Tsai TM et al., in 1999 [41]. The worst results were obtained by Takamoto K et al., and Mirza A et al., with CGE of 70% (n=32,M) and 69.6% (n=92,GA), respectively [42,43]. Flores LP in 2010 observed 100% CGE (n=13, B) [44]. CGE in the remaining studies was between 84.9 and 93.5% [44]. There were three trials contrasting open-wound and endoscopic procedures. When comparing the endoscopic group (79%, n=19, PS) to the open group (60%, n=15, PS) in 2009, Watts and Bain found statistically significant differences in CGE (p=0.229), but they also discovered a substantial decline in complication rates in the endoscopic group (p=0.044) [45]. In 2013, Dützmann S et al., discovered that the endoscopic group had better short-term outcomes, but that long-term outcomes were comparable [46]. There was no difference in the CGE outcomes between the open group (81.5%, n=27, B) and the endoscopic group (82.8%, n=29, B) in a randomised double-blind trial conducted in 2015 by Schmidt S et al., (p=0.47). However, endoscopic procedures have a higher risk of haematoma (p=0.05) [47].

In terms of long-term results, there does not appear to be any conclusive evidence that endoscopic techniques are preferable to open approaches, and there is conflicting research regarding the relative complication rates of the two. The fundamental benefit of this minimally invasive treatment is that it provides outcomes similar to open techniques while causing less damage to the tissues around the incision. However, the cost of the required equipment will go up, as will the requirement for further training, which will raise overall expenditures. Cobb TK et al., contend that the financial advantages of earlier return to work, quicker recovery from surgery, and lower facility costs outweigh the additional expense of the endoscopic approach. Based on predicted totals, they calculated the social benefits above the front-end repositioning to be "$522,565,775, for 2016." Although, it involved 73,673 cases and was conducted countrywide, there were no endoscopy or training costs included in this figure [40].

Minimal Incision

Taniguchi Y et al., developed a straightforward pressure release technique carried out without endoscopic vision in 2002 [48]. Use only one 1.5-2.5 cm incision, which revealed CGE of 77.8% (M) in 19 surgeries, with only one blood problem and no infections, Medial Antebrachial Cutaneous Nerve (MACN) injuries, or painful scarring recorded [48]. By using the skin around the elbow to relieve pressure at a total distance of 8-10 cm and using scissors as a preparatory surgical tool, this technique has lesions that are slightly closer or smaller than the endoscopic technique [48].

According to a 2010 study by Jeon IH et al., on 66 patients, 81% of those who underwent stages 1 and 2 McGowan surgery had positive outcomes, with a 3% postoperative complication rate at stage 2 haematomas [49]. 80% CGE was demonstrated by Karthik K et al., (n=46,B) [50] and 88% procedural satisfaction was reported by Adkinson JM et al., with 70% of patients demonstrating improvement [51].

In order to find 100% CGE (B) in both groups without complications, Cho YJ et al., compared a minimum of five surgical procedures with 10 open incisions of pressure relief in 2007 [52]. In 2013, Bolster MAJ et al., discovered no difference (p=0.628) in CGE between the minimal surgical treatment (93%, n=22, B) and the endoscopic technique (91%, n=20, B) [53]. In the endoscopic group, there was only one incidence of complication due to traumatic infection [53].

These studies suggest that, even though the overall length of the compression is shorter than open techniques and endoscopy, the endoscope may not actually be necessary to achieve comparable results when comparing the two smallest incision surgery techniques, despite the fact that there is not enough data to do so [53]. The most well-liked aspect of this approach, the pressure positions that emanate from the retrocondylar grooves to Osborne's tendons, as observed in the review of Bolster MAJ et al., [53]. With the help of this method, minor endoscopic benefits can be obtained without the use of expensive tools.

Subcutaneous Transposition

Nerve stress is decreased by modifying the ulnar nerve's path from back to front and toward the medial epicondyle. The ulnar nerve will develop a new subcutaneous channel as a result of movement. Extension of the entrapment neuropathy position, subcutaneous transposition surgery involves expansion surgery throughout the perimeter to allow the nerves to be shifted. The ulnar nerve's longitudinal artery should be preserved during surgery if needed. The nerves are shifted forward and secured with subcutaneous tissue once decompression is completed, positioning them in front of the flexor muscle group by completing a facial sling so that there is no movement of the nerves. Retrospective studies found that 12% of patients who underwent subcutaneous transposition surgery required revision surgery, compared to 25% of patients who underwent in situ decompression, with 78% of these revisions occurring within three years [54].

Submuscular Transposition

The ulnar nerve is moved to the bottom of the flexor/pronator group of muscles around the medial epicondyle during a procedure known as submuscular transposition. For thin patients or cases requiring revision [55], this surgical technique is performed. It is necessary to open up all swollen flexor pronator muscles in order to move the nerves using the submuscular transposition technique. Patients who are skinny typically have this kind of surgery. For patients with advanced disease, nerve movement is a very successful treatment [55]. It takes longer to operate on and is more likely to suffer complications. Following submuscular transposition surgery, wound complications are common. Increased infection rates (9% to 14% vs. 0-3%) and decreased feeling surrounding ulcers (19% vs. 3%) were reported in comparison to simple decompression in various investigations [36,56].

Medial Epicondyle (In-situ Release with Medial Epicondylectomy)

CuTS can be treated with a procedure called a medial epicondylectomy, according to King T and Morgan FP [57]. This procedure involves removing part of the medial epicondyle while being careful not to damage the medial collateral ligament. Its goal is to relieve pressure on the nerves [58]. An anterior transposition is necessary during the procedure to ease ulnar nerve stress [59].

According to O'Driscoll SW et al., the majority of patients who undergo medial epicondyle surgery-about 19% of them-experience elbow pain following the procedure [56]. This elbow pain is thought to be the primary issue with epicondylectomy [60]. In actual application, regulating the hypermobile ulnar nerve and treating thin people are where this treatment is most effective.

In the study, clinical factors that influence patient outcomes were assessed, and it was discovered that 77% of patients reported being satisfied [61]. An 83% of patients who underwent medial epondylectomy surgery had excellent results, and a systematic analysis comparing this procedure to the transposition method found no statistically significant differences between the two approaches as [Table/Fig-5] [62].

Classification	Sensation	Movement	Claw-shaped hands	EMG®, m/sec	Treatment
Mild	Intermittent vibration paresthesia	Conscious weakness, poor flexibility	-	>40	Conservative
Moderate	Intermittent tingling paresthesia	Weak grip strength, finger adduction and abduction confined	-	40-30	Decompression
Severe	Persistent paresthesia, 2-PD abnormal	Muscle atrophy, failure of the fingers to adduct and abduct	+	<30	Anterior transposition

[Table/Fig-5]: Summary table of guidelines treatment with Cubital Tunnel Syndrome (CuTS).
EMG: Electromyography; 2-PD: Two-point discrimination

DISCUSSION

All of the surgical techniques mentioned are effective treatments for CuTS syndrome, but despite the use of various scoring scales and the difficulty of directly comparing studies, numerous multi-technique comparative studies have never been able to distinguish one technique as being superior to the others [63]. Although there is no evidence to support the use of particular positioning alterations in subluxation [64], it seems to be a reasonable solution based on biomechanics, which may explain its prevalence. The exception is subluxation of the ulnar nerve, which typically necessitates repositioning. It is unclear how functional and factually evaluated outcomes differ in value. One study revealed no association between functional and physiological outcomes in submuscular transposition, despite the fact that demonstrable increases in conduction velocity indicate the effectiveness of operation [65]. Improvements in conduction velocities have been used in certain studies to assess surgical success. For the patients, it is crucial to lessen symptoms like pain, numbness, and weakness so they may resume their daily activities. Due to this, researchers advise using unbiased metrics in future research, such as adhesion forces, two-point discrimination, and a consistent objective score scale.

The authors advise clinicians to offer pre- and postoperative severity levels of motion and sensory problems using the Louisiana State University Medical Center (LSUMC) grading system for grading of ulnar nerve entrapment categorisation system for ulnar nerve capture, which was developed by Biggs M and Curtis JA [66]. This is a result of the improvement made over the McGowan system and the Bishop score scale that was used by Schmidt S et al., who employed it as a common framework for evaluating patient satisfaction with functioning and improving symptoms [47].

Numerous writers advise using approaches that minimise the size, slitting, and degree of tissue dissection when comparing methods with comparable performances. These will also minimise the length of the procedure and the likelihood of complications. Although the use of smaller incisions and assistance in endoscopic vision is the current trend of many former open surgical procedures, such as appendectomy and cholecystectomy, no comparison studies have been done. In the present review, researchers demonstrated improved outcomes when an endoscope was used. Because of this, researchers doubt the alleged advantages of using an endoscope to treat endometrial problems and the increased cost associated, in a time when medical expenditures are rising. This can be regarded as one source of cost savings.

Education will be crucial in the future to emphasise the economic benefits of these operations. As expected, there are no techniques that could produce significantly better clinical outcomes than others. Benchmarks for classifying these treatments include cost analysis, the likelihood of having to return to work, postoperative complication rates (particularly those that result in readmission or a poor recovery), and surgical duration.

CONCLUSION(S)

In the general population, CuTS is a type of ulnar nerve compression neuropathy. To choose the best course of treatment, it is crucial to consider the patient's medical history, physical examination, and diagnostic assessment. In rare instances, CuTS can be successfully treated without surgery. Most patients should not need surgery before receiving treatment, if they have mild or moderate symptoms. Although the operation has good outcomes, it also depends on the procedures used.

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