



## Original Research Article

# Assessment of Outcomes of Ulnar Nerve Decompression

Authors

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## ABSTRACT

*Cubital tunnel syndrome is the second most common entrapment neuropathy of the upper limb. Surgical decompression is indicated in patients with persistent symptoms despite conservative management. The objective of this study was to assess outcome of ulnar nerve decompression in Tayside region. A total of 79 extremities in 63 patients were reviewed, The most common cause of cubital tunnel syndrome was idiopathic (58.2%), simple decompression was performed in 81% of patients and anterior subcutaneous transposition in 19% of extremities. The outcome was satisfactory in 83.6% extremities and poor in seven out of 54 extremities with duration of symptoms lasting more than 12 months.*

## INTRODUCTION

Ulnar nerve entrapment is the second most common nerve entrapment syndrome of the upper extremity and is the most common nerve entrapment around the elbow<sup>1</sup>. Feindel and Stratford<sup>2</sup> named it "cubital tunnel syndrome". Approximately 75000 cases of ulnar nerve entrapment syndrome are reported annually in the united states<sup>3</sup>.

The cubital tunnel is formed by the cubital tunnel retinaculum which straddles a gap of approximately 4mm between the medial epicondyle and the olecranon<sup>4</sup>. Ulnar nerve passes through this tunnel and the anatomical arrangement makes the nerve pass through a relatively constrained path and lies close to the axis of rotation of the joint. Consequently, the nerve is more exposed to stretching and sliding during elbow motion. The unusual anatomy and well recognized increase intraneural pressure during elbow flexion play a

key role in pathogenesis of cubital tunnel syndrome<sup>5</sup>.

Rheumatoid synovitis, inflammatory pannus, cubitus valgus, bony spurs, constricting fascial bands, subluxation of the ulnar nerve over the medial epicondyle, tumors, ganglia, direct compression, cigarette smoking and metabolic disorders can cause nerve compression. Sleeping in prone position with shoulder abduction and elbow flexion, a long drive with elbow positioned on window can cause the same symptoms<sup>1</sup>.

Medical management in the form of physiotherapy, avoidance of elbow flexion for a specified time, night splints in extension, local steroid injections and analgesics are all employed as standard treatments. Ulnar nerve decompression is indicated in patients who suffer persistent signs and symptoms, despite medical management. Various forms of surgical treatment have been described including simple decompression of the

cubital tunnel, anterior subcutaneous transposition, anterior or intramuscular transposition and medial epicondylectomy<sup>6</sup>.

### AIM AND OBJECTIVES

The aim of this study is to assess the outcome of ulnar nerve decompression. The main focus of the study is on the causes of persistence of symptoms after surgery.

### MATERIAL AND METHODS

All patients who had undergone surgery for cubital tunnel syndrome at Perth Royal Infirmary and Ninewells and Stracathro hospitals in the Tayside region were evaluated and followed up.

Patients were included in the study if the diagnosis of cubital tunnel syndrome had been made based upon clinical symptoms and signs with or without electrophysiological confirmation and had underwent surgical decompression from January 2005 to February 2009..

Clinical features, Preoperative nerve conduction study findings, surgical details and any patient complications were also obtained from the charts and noted in the proforma.

The outcome of the procedure was inferred from the review notes and was classified as completely relieved, improved, unchanged or worse. The outcome was termed as follows

‘completely relieved’- if patient had complete relief of their symptoms

‘improved’- when most of the preoperative pain had been relieved

‘unchanged’- if symptoms did not improve

‘worse’- symptoms worsened after surgery

The data was analysed using the stastical package for the social sciences software. Pearson’s Chi-square test for categorical data was used to investigate the relationship between outcome and the method of surgery. The significance level was set at 5%.

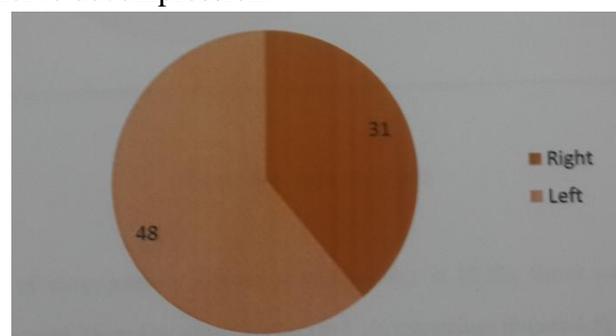
### RESULTS

Forty seven patients had unilateral decompression of the ulnar nerve and 16 patients had bilateral decompression. Eleven patients received bilateral

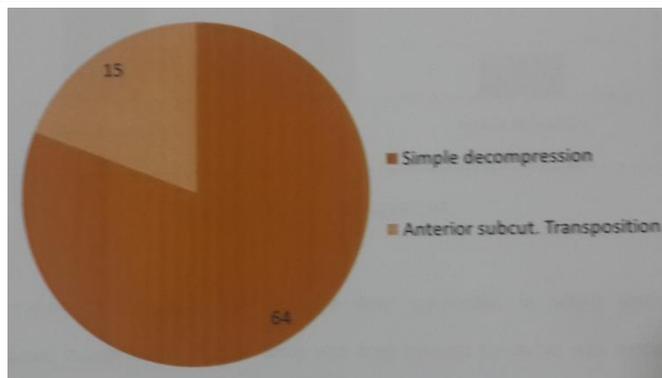
decompression on the same day and the remaining five had subsequent decompressions. The left side was operated in 60.75% and tourniquet was used in all decompressions (figure 1). Eight decompressions were combined with other surgical procedures in the extremity; seven patients had simultaneous carpal tunnel releases and one had a trigger finger release. The mean tourniquet time was 32minutes. Simple decompression was used to release the ulnar nerve compression in 81% extremities an in 19% extremities, anterior subcutaneous transposition of the nerve was done (figure 2).

The outcome of the surgery could be determined in 73 extremities. Surgery completely relieved symptoms in 16.4% extremities and improvement of symptoms was seen in 67.1% extremities. Symptoms were unchanged in 12.3 % and worsened in 4.1% extremities. Four patients were lost to follow up (figure 3).

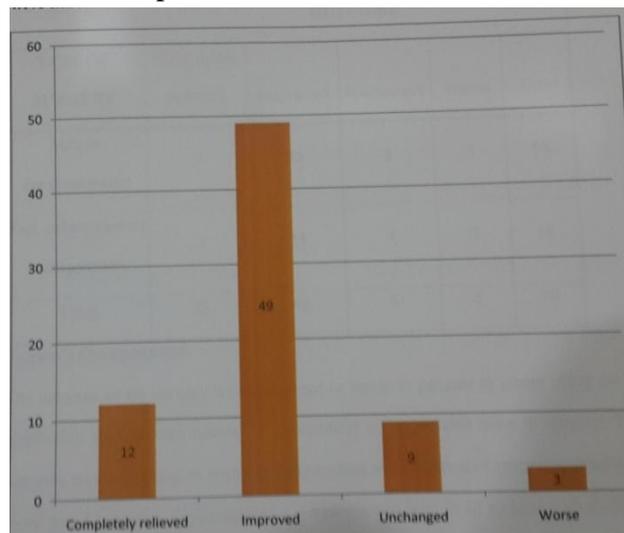
Pearson’s Chi-square test (figure 4) was used to find an association of outcome with the type of surgery, was statistically insignificant ( $p=0.677$ ). The outcome of the surgery was unchanged or worse in patients in whom either nerve conduction studies were normal (7 extremities) or unavailable prior to surgery. The outcome was unchanged or worse in 7 extremities with duration of symptoms persisting more than 12 months. Improvement of symptoms was seen in all patients with diabetes mellitus as they were explained pre operatively about the residual effects of the disease. One patient with cervical spondylosis showed T1 radiculopathy on pre- operative nerve conduction studies had no relief of symptoms after ulnar nerve decompression.



**Figure 1** showing the number of sides decompressed.



**Figure 2** showing type of surgeries for ulnar nerve decompression.



**Figure 3** showing the outcome of the ulnar nerve decompressions performed.

TYPE OF SURGERY	OUTCOME				Total
	Completely relieved	Improved	Unchanged	Worse	
Simple decompression	9	38	8	3	58
Ant. subcutaneous transposition	3	11	1	0	15
<b>Total</b>	<b>12</b>	<b>49</b>	<b>9</b>	<b>3</b>	<b>73</b>

**Figure 4** showing outcome of the surgery according to the type of surgery.

**DISCUSSION**

Ulnar nerve decompression is indicated in patients who despite medical management, have persistent signs and symptoms. Various surgical techniques such as simple decompression<sup>3</sup>, anterior subcutaneous transposition<sup>5</sup>, submuscular or intramuscular

transposition, and medial epicondylectomy<sup>6</sup> have shown promising results.

The current study showed that ulnar nerve symptoms were completely relieved or improved in 83.6% extremities, which is consistent with a study conducted by Macnicol<sup>7</sup> who showed excellent and good results in 82% cases<sup>7</sup>.

Asamoto et al<sup>8</sup> excellent and good results in 87.5% patients. The better results by Asamoto may be due to the use of an operating microscope and pre-operative confirmation of cases by nerve conduction studies.

The left side was operated in 60.75% extremities in this current study. This finding was in concordance with a study by Filippiet al<sup>9</sup>. In which they observed 26 out of 40 patients with symptoms in non-dominant limb. In this study 16 patients (25.3%) presented with bilateral compression of the ulnar nerve which was far more than the previous studies such as Macnicol<sup>7</sup> who found only 10 out of 100 patients with bilateral symptoms, Bartels et al<sup>10</sup> found 8% with bilateral involvement. The effect of duration of symptoms upon clinical outcome was emphasized by Macnicol<sup>7</sup>. He suggested that recovery was greatest when surgery was performed within 3 months of the onset of symptoms. In this study, 54 of 79 extremities had been symptomatic for over 1yr prior to decompression. However, this study showed that only seven extremities with history of more than 12 months had unsatisfactory outcome. In this current study, nerve conduction studies were suggestive of ulnar nerve compression in 52 extremities at the elbow. Most patients who either had normal NCS or in whom NCS was not done pre-operatively, showed no relief of symptoms. This suggests that nerve conduction studies carry a significant value in diagnosing the disease and could be performed in every patient with cubital tunnel syndrome. Asamoto et al selected the patients for surgery on the basis of persistent clinical symptoms and positive nerve conduction studies, and provided good and excellent recovery in 87.5% cases.

Simple decompression was used to release the ulnar nerve compression in 81% extremities and

in 19% extremities, anterior subcutaneous transposition of the ulnar nerve was done. The outcome of both procedures was satisfactory and statistically insignificant. This is in concordance with Zlowodzki et al<sup>3</sup> who in their meta-analysis suggested that there was no difference in motor nerve conduction velocities or clinical outcome scores between simple decompression and ulnar nerve transposition.

Our study was a retrospective review of the patients in an attempt to assess the outcome of ulnar nerve decompressions and consequently has certain limitations. The study included patients who had concurrent surgical procedures in the extremity and also those who had associated systemic problems or problems in the extremity that could confound the results of the ulnar nerve decompression.

## CONCLUSION

The purpose of this study was to assess the outcomes of ulnar nerve decompressions performed in Perth Royal Infirmary and Ninewells and Stracathro hospitals in the Tayside region.

This study found that ulnar nerve decompression carried out either with simple decompression or anterior subcutaneous transposition was effective, resulting in more than 80% successful outcomes. Males were more commonly affected which suggested an occupational association with the disease. Left side was more commonly involved. Abberent anatomical findings and space occupying lesions in the cubital tunnel were found to be rare and most cases of cubital tunnel syndrome were idiopathic demonstrating a tighter canal. There was no significant difference found with the duration of onset of symptoms and outcomes of the surgery. Persistent numbness and local scar tenderness were found to be the most common residual effects of the ulnar nerve decompression. True recurrence and complex regional pain syndromes, though rare were also encountered in this study.

This study proposes that pre-operative nerve conduction studies (NCS) are essential in patients with suspected cubital tunnel syndrome to help in

proper selection of patients who would benefit from the surgery.

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