

# Anterior transposition of ulnar nerve

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## Abstract

A 27 year male patient, a case of left sided ulnar neuritis, was operated with anterior transposition of ulnar nerve and showed complete recovery at six months follow up.

**Keywords:** Anterior transposition; cubital tunnel syndrome; neuropathy; ulnar nerve.

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## INTRODUCTION

The ulnar nerve can be compressed to varying degrees in its path along the upper limb, with the elbow being the most frequent localization. The resulting neuropathy, known as the cubital tunnel syndrome (CTS) is the second most frequent upper limb neuropathy after carpal tunnel syndrome. Despite the presence of bone problems (osteophytes, post-fracture cubitus valgus), soft tissue masses (ganglion, tumor), posttraumatic strictures of fascial structures and subluxation of the ulnar nerve on the medial epicondyle in some patients, no certain etiology can be determined in most of the cases and it is thus evaluated as idiopathic.<sup>2,3</sup> Patients often report pain at the medial aspect of the elbow which radiates into the proximal forearm and behind the medial epicondyle, as well as weakness of intrinsic muscles and grip strength. In severe and prolonged instances, significant atrophy of the intrinsic musculature, especially the first dorsal interosseous muscle, may also occur.<sup>3</sup> The initial treatment of acute and subacute entrapment neuropathy is

conservative. Surgical decompression of the ulnar nerve is indicated when non operative methods fail to relieve these symptoms and neurosensory and motor tests document progressive ulnar nerve dysfunction or a degree of nerve compression resulting in axonal loss.<sup>4,5</sup> Several techniques have been described over the years, including simple decompression<sup>6</sup>, anterior transposition (subcutaneous, intramuscular, or submuscular)<sup>7,8</sup>, medial epicondylectomy<sup>(w2-8-10)</sup> and *in situ* endoscopic decompression<sup>9,10</sup>

## CASE REPORT

A 27 yr old male patient presented with complaints of pain at left elbow since 5 months and tingling numbness in left 5<sup>th</sup> finger and medial half of 4<sup>th</sup> finger since 2 months. Patient had preceding history of trauma to left elbow 5 months back and was diagnosed with closed left medial epicondyle of humerus fracture and was treated conservatively. Patient developed stiffness at left elbow one and a half months following conservative management and was advised physiotherapy for same. When expected result was not seen, manipulation at left elbow under anaesthesia was carried out on postoperative two and a half months. Two weeks following manipulation patient started having tingling numbness in left 5<sup>th</sup> finger and medial half of 4<sup>th</sup> finger and gradually developed claw hand deformity. Physical examination revealed decreased sensations in hand, no atrophy was noted. Electromyography revealed left ulnar neuropathy. MRI report was suggestive of left ulnar neuritis.



**Figure 1:** Preoperative clinical picture showing clawing of 4<sup>th</sup> and 5<sup>th</sup> fingers

Patient was operated with anterior transposition of ulnar nerve. The elbow was not immobilized postoperatively

and immediate active range of motion exercises were encouraged.



**Figure 2:** Intra operative picture showing ulnar nerve

Patient had complete recovery of sensations and movements at fingers at six months follow up period after ulnar nerve repositioning surgery.



**Figure 3:** Postoperative clinical picture at six months follow up period

## DISCUSSION

Ulnar nerve entrapment at the elbow, the cubital tunnel syndrome, is increasingly recognized as a source of upper-extremity sensory and motor symptoms. The treatment for nerve compression is the decompression of the nerve. No consensus exists in the literature regarding the optimal surgical treatment for cubital tunnel syndrome<sup>3,11,12,13,14</sup>. Surgical treatment options include open and endoscopic simple decompression, decompression with medial epicondylectomy and anterior transposition of the nerve (subcutaneous, intramuscular or submuscular)<sup>4,15,12,14,16</sup>. In simple decompression, all tissues constricting the ulnar nerve, mainly the Osborne's ligament are released; however, the nerve is not separated from its bed in the bone tunnel. In medial epicondylectomy, in addition to simple decompression, the bone tunnel is expanded by removing a fragment of the bone from the medial epicondyle and thus the

compression on the ulnar nerve is relieved. This procedure may result in more complications than simple decompression.<sup>17</sup> The extrinsic pressure on the nerve can be removed through both of these methods, but the intraneural pressure remains unchanged. The basic idea behind ulnar nerve transposition is relieving the intraneural intrinsic pressure which occurs with the traction of the nerve during elbow flexion<sup>18</sup>. The ulnar nerve is subject to traction, friction and pressure with normal elbow motion. The cubital tunnel narrows during elbow flexion as Osborne's ligament stretches and the medial collateral ligament bulges beneath the nerve<sup>19,20</sup>. Anterior transposition of the ulnar nerve, which relaxes the traction and strain on the nerve that leads to increased intraneural pressure with elbow flexion, will serve to treat the etiology. Simple decompression and decompression with medial epicondylectomy reduces the extrinsic pressure on the nerve, but does not change the traction effect. It is

shown that simple decompression does not prevent the traction forces occurring on the nerve with elbow flexion<sup>21</sup>. Subcutaneous anterior transposition of the ulnar nerve is frequently performed as it is a simple procedure with a high success rate and very few complications. In the absence of an anatomic lesion, proponents of simple decompression argue that the ulnar nerve transposition involves an unnecessary extensive dissection and the risk of nerve injury or devascularization. In turn, proponents of anterior transposition consider that dynamic compression of the nerve with elbow flexion<sup>22,23</sup> can only be properly resolved by this technique. Subcutaneous transposition has the advantages of being less invasive, less technically demanding, and allowing for early postoperative mobilization<sup>24</sup> when compared with intramuscular or submuscular transposition of the ulnar nerve; however, it places the nerve in a position vulnerable to repetitive trauma, particularly in thin patients. Complications such as deterioration in ulnar nerve functions and painful neuroma development have been reported after anterior subcutaneous transposition<sup>12</sup>. Cubital tunnel surgery has an average 20% overall rate of failure, with up to 35% of patients having residual symptoms at the surgical site after surgery<sup>25</sup>. Failed surgery can be attributed to inadequate decompression, creation of iatrogenic compression, iatrogenic nerve injury, scar formation, kinking of the ulnar nerve or nerve subluxation. Iatrogenic compression can occur at the medial intermuscular septum with anterior transposition as a result of inadequate proximal and distal mobilization of the nerve, as well as kinking of the nerve over an unreleased septum<sup>26</sup>. The medial intermuscular septum should be resected in all patients so that it does not become a proximal site of compression after anterior transposition<sup>15,26</sup>. Cutaneous neuromas are a common cause of continued pain after cubital tunnel surgery. The medial antebrachial cutaneous nerve may be injured or transected during exposure of the ulnar nerve. Careful dissection at the time of the original surgery is key to preventing nerve injury. The deterioration in ulnar nerve functions is probably due to devascularization of the nerve<sup>26</sup>.

## CONCLUSION

Subcutaneous anterior transposition of the ulnar nerve is a safe and effective technique for the treatment of its compression at the elbow, in addition to being a simple technique and that is performed relatively quickly. The duration and severity of preoperative symptoms are the main prognostic factors and significantly influence the postoperative recovery of these patients. Therefore, surgical treatment should be advised as soon as axonal injury becomes clinically evident and patients with

prolonged symptoms should be cautioned about the possibility of not obtaining a complete clinical recovery.

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