Use of the Roof of the Cubital Tunnel as a Ligamentofascial Sling during Anterior Ulnar Nerve Transposition

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Objective
To report a new technique using the roof of the cubital tunnel as a ligamentofascial sling to maintain anterior position during ulnar nerve transposition.

Methods
Operative Technique

- The roof of the cubital tunnel is formed by a ligamentofascial band composed of the cubital tunnel retinaculum and antebrachial fascia that extends from the olecranon to the medial epicondyle. This technique creates a non-compressive ligamentofascial sling using the released band.

- An 8-to 10-cm curved, longitudinal incision is centred over the cubital tunnel.
  - The medial antebrachial cutaneous nerve is identified and preserved.
  - The ulnar nerve and its vascular bundle are identified just proximal to the ligamentofascial band and dissected distally from the posterior aspect of the band. The band is incised medially to raise a 3-cm wide and 3-cm long flap based on the medial epicondyle, and tailored to wrap around the ulnar nerve and its vascular bundle.

- The origin of the flexor-pronator muscles is identified, and a 3-cm incision is made to the fascia overlying the muscles along this line. After the ulnar nerve and its vascular bundle are transposed anteriorly to the medial epicondyle, the band is loosely attached to the incised fascia overlying the flexor-pronator muscles to function as a sling.

- A bulky elbow dressing is maintained postoperatively and patients are encouraged to resume elbow motion immediately.

Patients
Twenty-three elbows in 21 patients were assessed for primary chronic cubital tunnel syndrome without restriction of excursion or fixed deformity. Of the 23 elbows, 12 had no specific aetiology (idiopathic) and 11 showed ulnar nerve (sub)luxation. This study included 15 men and 6 women, with ages ranging from 17 to 74 years. Three patients were athletes. According to McGowan's classification of severity, 6 elbows were grade I (minimal), 12 were grade II (intermediate), and 5 were grade III (severe).

Results
Seventeen elbows were available for direct follow-up and 6 were contacted for a telephonic survey. The mean follow-up period was 3 years (range, 4 months to 9 years). According to the Messina grading system, 91% of the elbows had excellent or good results and only 9% had fair results. Pain was completely relieved in all 23 elbows, with improved sensation and motion. Patients with excellent or good results recovered sensitivity and muscular activity within several months. However, severely affected elbows showed little improvement. None of the cases required secondary surgery or had postoperative posterior nerve subluxation, and no injury to the medial antebrachial cutaneous nerve was observed.

Conclusions
Posterior subluxation after anterior transposition is an uncommon but serious complication. Our new technique addresses this complication at the time of surgery. The ligamentofascial sling provides a wide, non-compressive flap, without tenting or kinking of the nerve. This prevents nerve instability, without restraining excursion during elbow motion. This procedure is indicated for primary chronic cubital tunnel syndrome, but is contraindicated in patients with an insufficient ligamentofascial band or an elbow with a severe fixed deformity.

<table>
<thead>
<tr>
<th>Clinical Outcomes</th>
<th>Preoperative McGowan Severity</th>
<th>Postoperative Messina grading system</th>
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<tbody>
<tr>
<td>(N=23)</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>Grade I (minimal)</td>
<td>(6)</td>
<td>6</td>
</tr>
<tr>
<td>Grade II (intermediate)</td>
<td>(12)</td>
<td>11</td>
</tr>
<tr>
<td>Grade III (severe)</td>
<td>(5)</td>
<td>1</td>
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