Revision of Carpal Tunnel Release for Persistent or Recurrent Carpal Tunnel Syndrome

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** Nothing to disclose **
Introduction
Open and Endoscopic Carpal Tunnel Release (OCTR / ECTR)

Advantages of OCTR:
- Direct visualization of TCL and median nerve

ECTR:
- Higher persistence and higher recurrence rate
- Potentially increased risk of an incomplete release

Dina L. Hulsizer, Michael P. Staebler, Arnold-Peter C. Weiss, et al., J Hand Surg 1998; 23A: 865-869
Persistent / Recurrent CTS

- Recurrent CTS:
  - Reappearance three months following the surgery

- Persistent CTS:
  - No improvement after surgery

- Repeat TCL release and median nerve neurolysis
- May not relieve symptoms as primary CTR


Purpose

Analyze the patients, persistent or recurrent symptoms

- After carpal tunnel release, from single surgeon

- Baseline data

- Prior operation method (ECTR or OCTR)

- Technique applied in the revision surgery

- Outcomes
Materials and Methods

- Sep 2011 - Sep 2013
- 21 consecutive patients
- All received revision CTR (ECTR or OCTR)
  - Followed in the clinics until the end-point
  - Confirmation of subjective symptoms with or without improvement
Results: Baseline Data

- 9 males / 12 females
- Mean age: 57.7 years
- 17 Recurrent / 9 Persistent (total 26 hands)
- CTS and Chronic renal failure (hands)
  - CRF: 13 (hemodialysis for average 22.4 years)
  - Non-CRF: 13
<table>
<thead>
<tr>
<th>Primary surgery</th>
<th>OCTR</th>
<th>ECTR</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent</td>
<td>0</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Persistent</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>21</td>
<td>26</td>
</tr>
</tbody>
</table>

- Average interval between the first and our CTR: 5.9 years (53 days -10.4 years)
  - Mean follow-up duration: 90 days
- Pre-operative NCV study: 24 hands
  - Positive findings: 100%
  - Recurrent: 15 / Persistent: 8
Results: Revision of Carpal Tunnel Release

- OCTR: 10 (8) / ECTR: 16 (18)
  - Shifted to OCTR intra-operatively: 2
  - TCL completely released during endoscopic approach
## Results: Operative Findings

<table>
<thead>
<tr>
<th>Op Finding</th>
<th>Hands</th>
<th>Recurrent (17)</th>
<th>Persistent (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCL incomplete release</td>
<td>20</td>
<td>70.6% (12)</td>
<td>88.9% (8)</td>
</tr>
<tr>
<td>Dense scar</td>
<td>4</td>
<td>23.5% (4)</td>
<td>-</td>
</tr>
<tr>
<td>Adhesion</td>
<td>3</td>
<td>11.8% (2)</td>
<td>11.1% (1)</td>
</tr>
<tr>
<td>Palmar fascia</td>
<td>1</td>
<td>5.9% (1)</td>
<td>-</td>
</tr>
<tr>
<td>Tenosynovium</td>
<td>1</td>
<td>5.9% (1)</td>
<td>-</td>
</tr>
</tbody>
</table>

TCL incomplete release (20): Intact TCL at distal tunnel observed by endoscopy
Only one hand without improvement (Recurrent case)
- Left recurrent CTS revised by OCTR → improved
- Right recurrent revised by ECTR → no improvement
  → Re-revised (OCTR) 3 months later
  → No improvement at final follow-up (49 days)
Discussion: Recurrent CTS following CTR

- Reported frequency of reoperation: 0.3 to 12%
- Incomplete transection of the TCL / flexor retinaculum: frequent cause

Amadio PC. J Hand Surg, 2009;34A

- Iatrogenic nerve lesions or active flexor tenosynovitis
- Perineural fibrosis
Persisting or recurrent prevented in 83%

Skilled surgeons by thorough operative technique

Based on exact knowledge of the anatomy


Repeat operations

Continue symptoms: 43 - 90%, No relief: 20%

In our study: revision by endoscopic approach

Overall successful rate: 88.9%
MR Imaging of the Carpal Tunnel: Normal Anatomy and Preliminary Findings in the Carpal Tunnel Syndrome

Fig. 7.—Coronal MR image (TR 600, TE 25) (A) and anatomic section (B) through hook of hamate, pisiform, and tubercle of trapezium. (See key for abbreviations.)

MIDDLETON ET AL.
Endoscopic Release of Recurrent CTS

**Limitations:**
- Nerve injury suspected
- An extensive primary approach—difficulty in locating entry
- Several previous open revisions—contraindication: possible variations in the anatomy or extensive scarring

**Results:**
- Comparable to those achieved with open revision

Primary CTR

Recurrent Numbness

NCV

Non-CTS

Refer to neurologist

CTS

Persistent Numbness

< 3 months

Observation and NCV at 3rd Month

Compare NCV to prior study

Not improved

Limitation for endoscopic approach

(+)

Observation

Improved

(-)

Endoscopic approach

TCL (+)

ECTR

TCL (-)

OCTR

> 3 months

NCV

Limitation for endoscopic approach

(+)

Observation

Not improved

Improved

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