

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

Chao-Ming Wu, Yu-Te Lin, Bon-Yun Chou, Chih-Hao Chen,
Han-Tsung Liao, Cheng-Hung Lin, Chung-Chen Hsu, Jiun-
Ting Yeh

Division of Trauma Plastic Surgery, Department of Plastic
and Reconstructive Surgery, Chang Gung Memorial
Hospital, Linkou, Taiwan

**** Nothing to disclose ****

Chang Gung Memorial Hospital

Department of Plastic & Reconstructive Surgery, Division of Trauma Plastic Surgery



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

Raimbeau G, Chirurgie de la main. 2008;27:134–145

- **Persistent CTS:**
 - No improvement after surgery

Symptoms	Potential Causes	Treatment Options
Persistent	Incomplete release of the TLC	<ul style="list-style-type: none"> ● Revision CTR
Recurrent	Circumferential fibrosis Reconstitution of the TLC	<ul style="list-style-type: none"> ● Revision CTR ● Neurolysis ● Interposition graft <ul style="list-style-type: none"> ○ Synovial flap ○ Muscle flap ○ Hypothenar fat pad flap ○ Vein wrap
New	Nerve injury	<ul style="list-style-type: none"> ● Neurolysis ● Nerve repair ● Interposition graft

Mosier BA, Hughes TB, Hand Clin. 2013;29:427

- 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



Primary surgery	OCTR	ECTR	Total
Recurrent	0	17	17
Persistent	5	4	9
Total	5	21	26

- 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

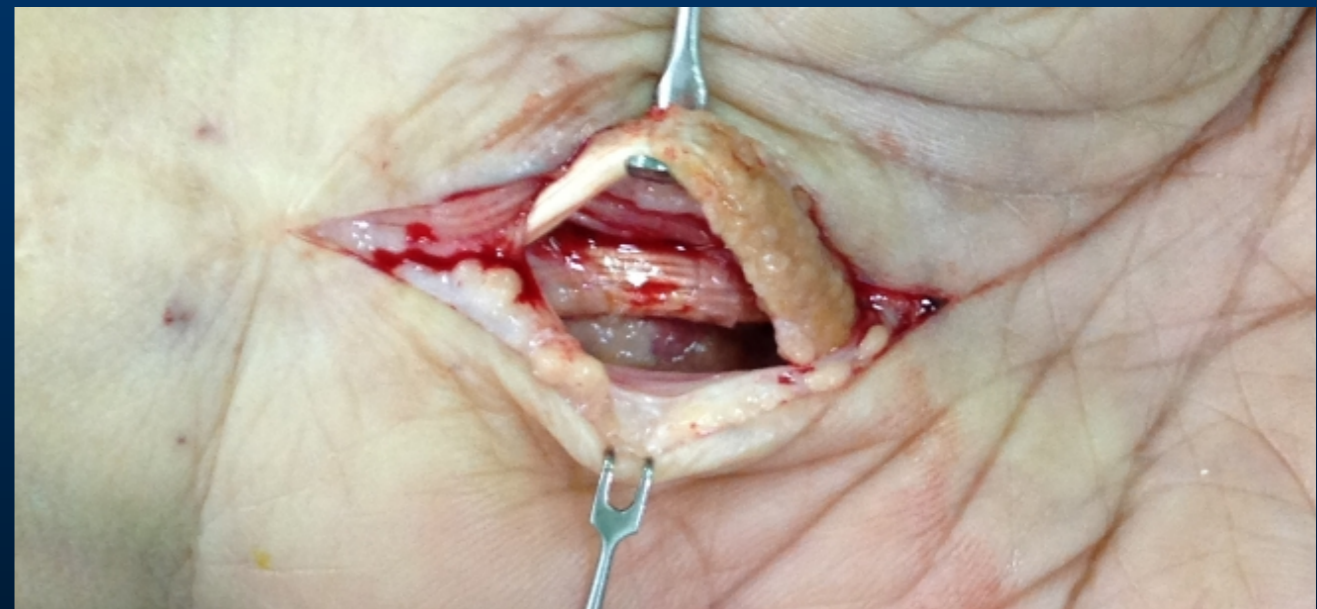
- OCTR: 10 (8) / ECTR: 16 (18)
 - Shifted to OCTR intra-operatively: 2
 - TCL completely released during endoscopic approach



Results: Operative Findings

Op Finding	Hands	Recurrent (17)	Persistent (9)
TCL incomplete release	20	70.6% (12)	88.9% (8)
Dense scar	4	23.5% (4)	-
Adhesion	3	11.8% (2)	11.1% (1)
Palmar fascia	1	5.9% (1)	-
Tenosynovium	1	5.9% (1)	-

TCL incomplete release (20):
Intact TCL at distal tunnel
observed by endoscopy



	Operative Method	No Numbness	Improvement	No Improvement
Recurrent (17)	ECTR	4	6	
	OCTR		6	1
Persistent (9)	ECTR		5	
	OCTR	1	3	

- 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

Luria S, Waitayawinyu T, Trumble TE. Plast Reconstr Surg. 2008;121:2029

- 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

STÜTZ N, GOHRITZ A, VAN SCHOONHOVEN J et al. J Hand Surg. 2006;31

- 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

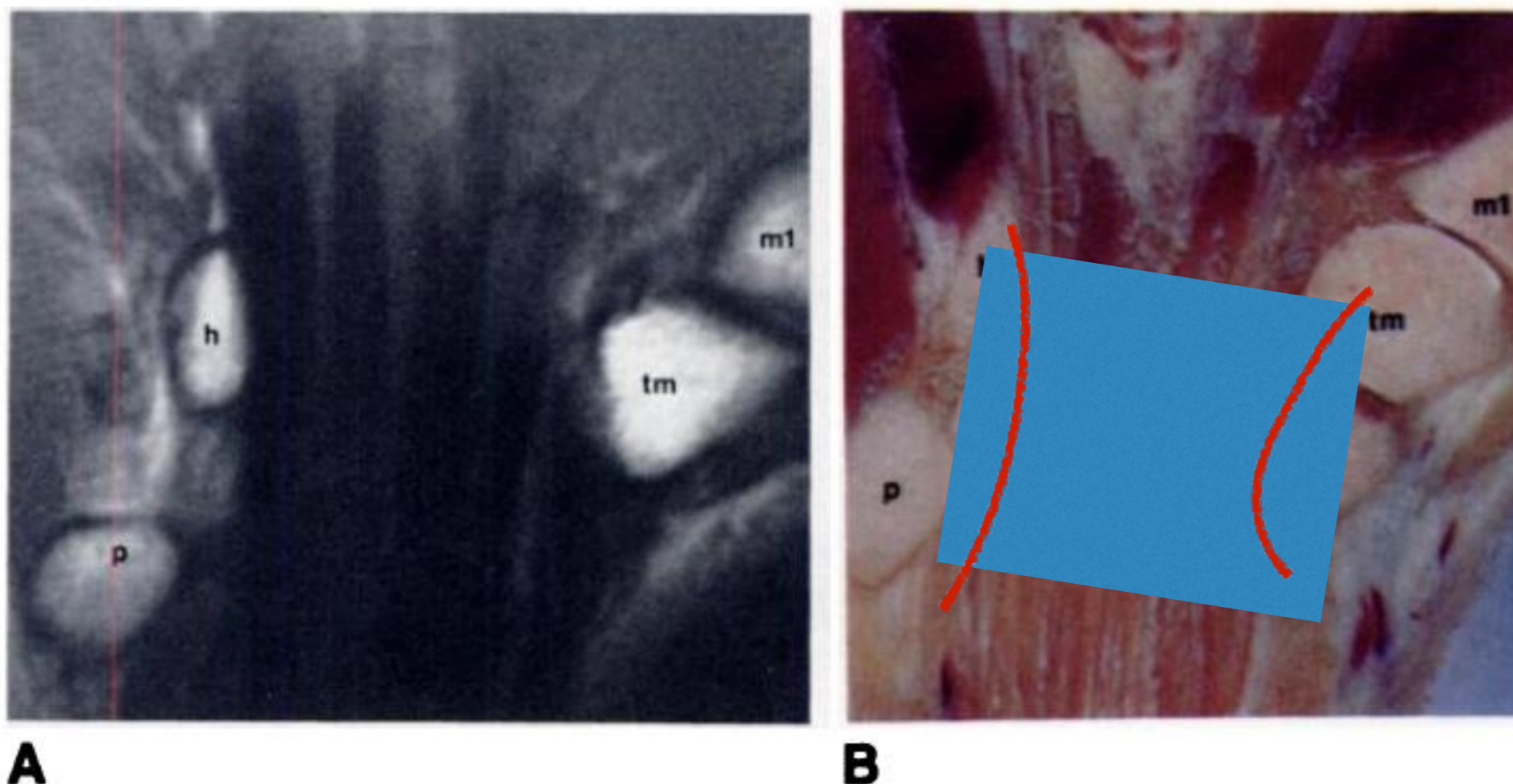


Fig. 7.—Coronal MR image (TR 600, TE 25) (A) and anatomic section (B) through hook of hamate, pisiform, and tubercle of trapezium. (See key for abbreviations.)

MIDDLETON ET AL.

AJR:148, February 1987

Chang Gung Memorial Hospital

Department of Plastic & Reconstructive Surgery, Division of Trauma Plastic Surgery

*



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

Luria S, Waitayawinyu T, Trumble TE. Plast Reconstr Surg. 2008;121:2029



