



OVATION
HAND INSTITUTESM

Carpal Tunnel Syndrome & Thread
Carpal Tunnel Release (TCTR)

The Guo Technique

Minimally Invasive Procedure for CTR

Danzhu Guo, MD

10.4.18

Special Surveillance Reports

High Priority Industries

Economic Burden of Carpal Tunnel Syndrome

SHARP Investigates Heat-related Illness in Washington State's Workers

SHARP Investigates Hospitalized Occupational Burns

Occupational Health Disparities

Economic Burden of Carpal Tunnel Syndrome



One way to establish priorities for prevention in public health is to document the "burden" that different types of illness or injury impose on society.

Earlier SHARP research showed that workers' compensation costs for Carpal Tunnel Syndrome (CTS) were among the highest of all injuries or illnesses.

However, the full economic loss that results from work-related injury also includes costs borne by employers and also by the employees themselves. One of the largest of these additional costs is the long-term loss of earnings, which can extend long beyond the period of payment of wage replacement

benefits to claimants whose injuries temporarily prevent them from

Wisconsin Occupational Health Indicator Report

Summary of Worker Health and Safety Data For Years 2003 – 2012

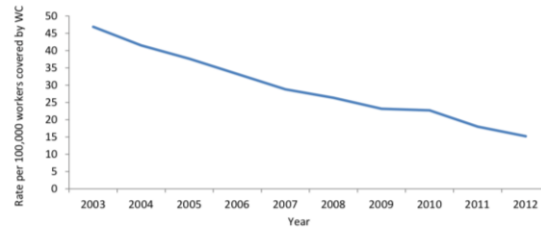
Published April 2016

Wisconsin Department of Health Services

Wisconsin

Wisconsin's incidence rate of carpal tunnel syndrome cases filed with workers' compensation declined by an average of 11% annually during 2003-2012. Wisconsin workers' compensation insurance paid an average of \$3 million per year for carpal tunnel syndrome alone. **CTS has the longest average disability duration among the top 10 workers' compensable injuries.**

Figure 8.2. Incidence Rate of Carpal Tunnel Syndrome Cases Filed with Wisconsin Workers' Compensation System (2003-2012)



Data Source: Wisconsin Workers' Compensation data from Wisconsin Department of Workforce Development; National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation

Table 8.1. Number and Incidence Rate of Carpal Tunnel Syndrome Cases Filed with Wisconsin Workers' Compensation System (2003-2012)

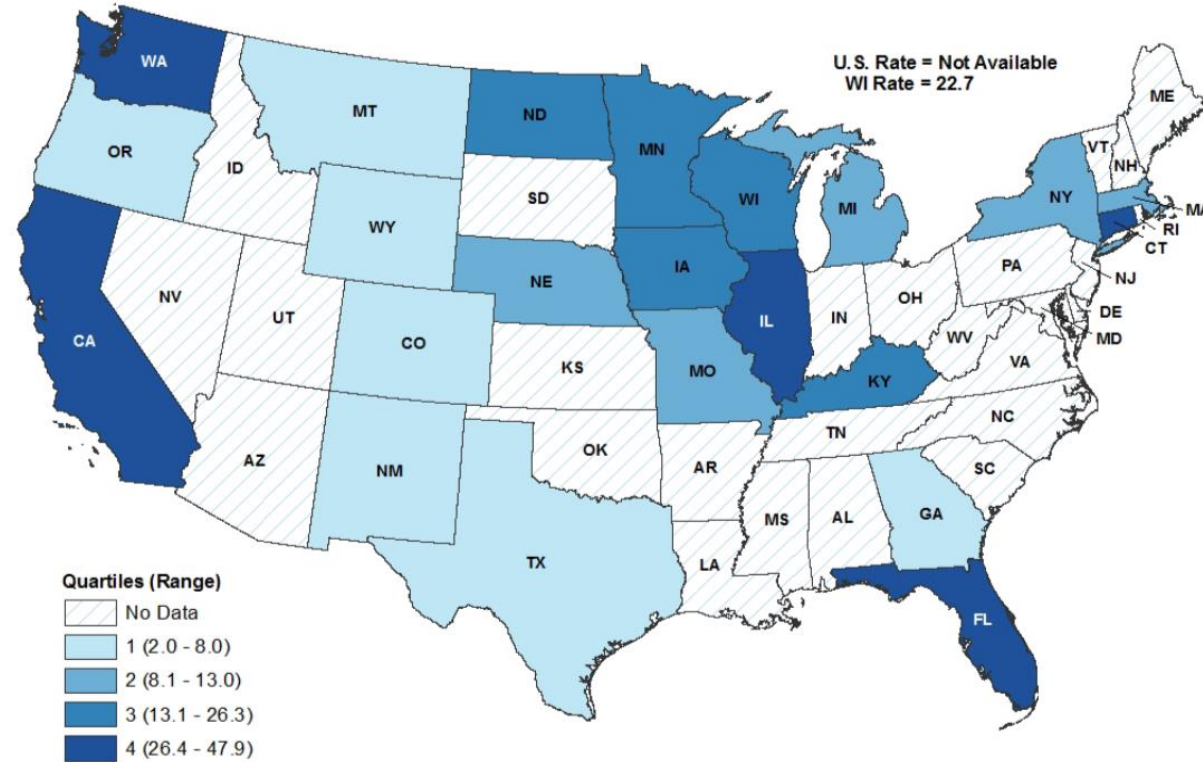
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	U.S. 2012
Number of carpal tunnel syndrome cases filed with Wisconsin Workers' Compensation System	1219	1090	1000	890	776	703	588	573	460	384	*
Incidence rate of carpal tunnel syndrome cases filed with Wisconsin Workers' Compensation per 100,000 workers covered by system	46.8	41.5	37.6	33.2	28.8	26.3	23.2	22.7	18.0	15.2	*

* U.S. data not calculated due to varying eligibility criteria among states
Data Source: Wisconsin Workers' Compensation data from Wisconsin Department of Workforce Development; National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation available at http://www.nasi.org/sites/default/files/research/NASI_Work_Comp_Year_2014.pdf

CTS has the longest average disability duration among the top workers' compensable injuries

Indicator 8: Carpal Tunnel Syndrome Cases Identified in State Workers' Compensation System

Figure 8.1 Annual Incidence Rate* of Carpal Tunnel Syndrome Cases among Covered Workers by State, 2010



*Rate per 100,000 workers covered by state workers' compensation system

Data Source: State Workers' compensation systems data available at CSTE website; National Academy of Social Insurance (NASI) estimate of workers covered by workers' compensation.

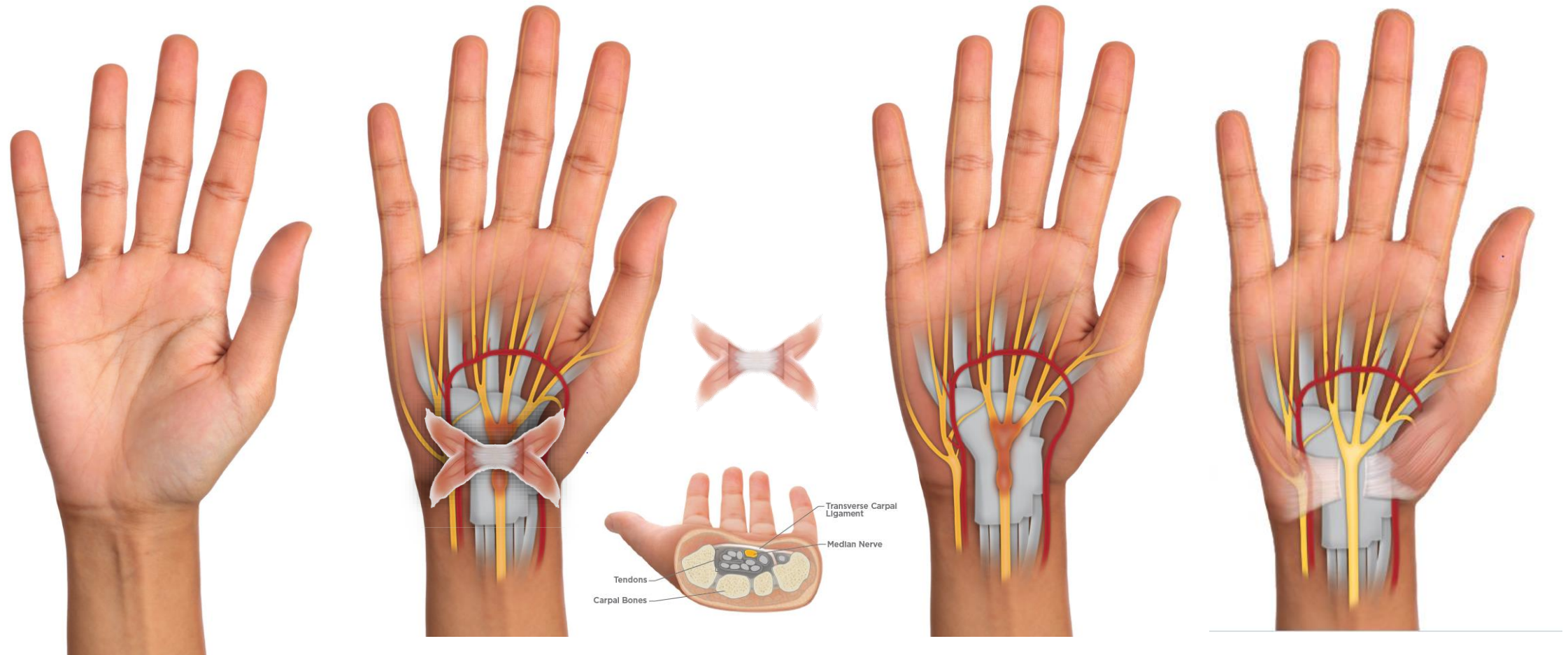
Limitation: Workers' compensation eligibility criteria and availability of data from workers' compensation programs varies among states, prohibiting state-level data from being directly compared to other states or with national estimates.

Facts related to CTS

United States, '06, US population : 325M

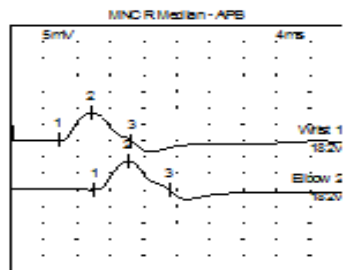
- CTS prevalence: 3.7% of general population
 - US population: 325M
 - 12M new CTS per year
- CTS 50% occupational injuries
 - > \$20 B in WC costs per year
- CTR incidence rate: 2/1000
 - 600k CTR per year
- OCTR & ECTR
 - \$1 billion for a device supplants
 - Health care cost: >\$2 billion per year

What is Carpal Tunnel Syndrome

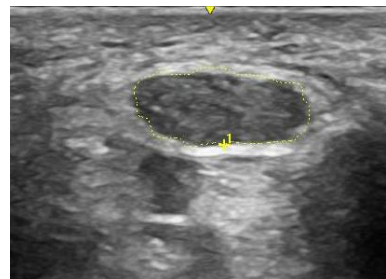


Diagnosis

EMG/NCS



Ultrasound



Therapeutic Injection



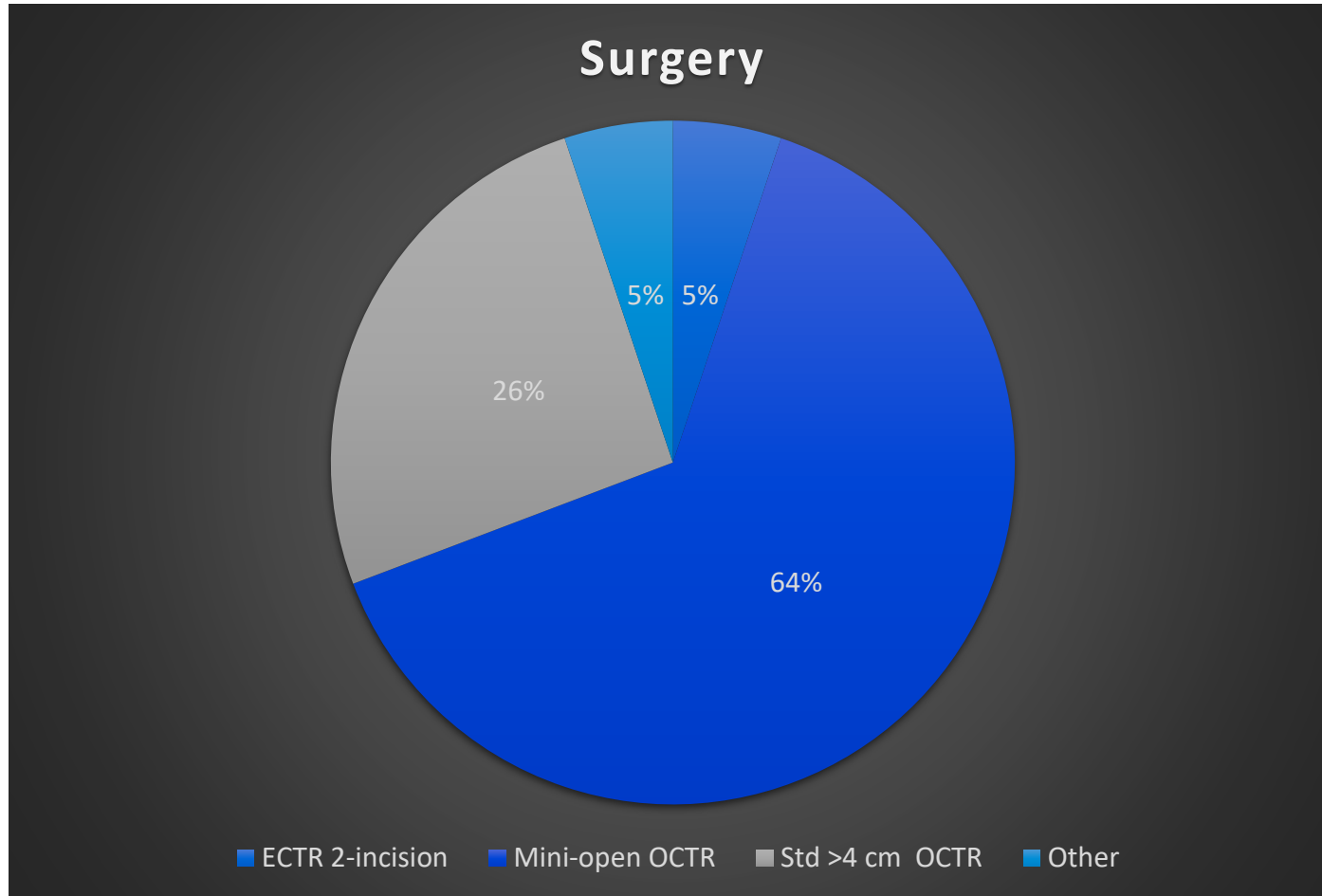
Carpal Tunnel Release

Standard Open
4 cm incision

Mini Open
2 cm incision

Endoscopic
1 cm incision

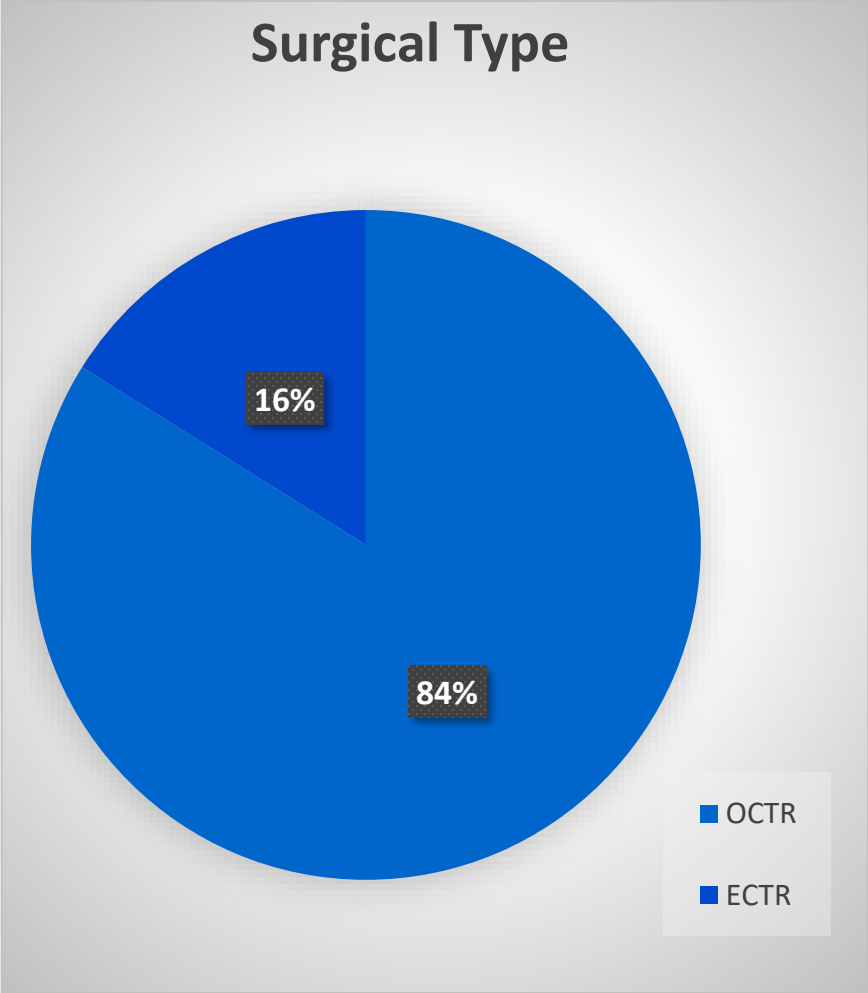
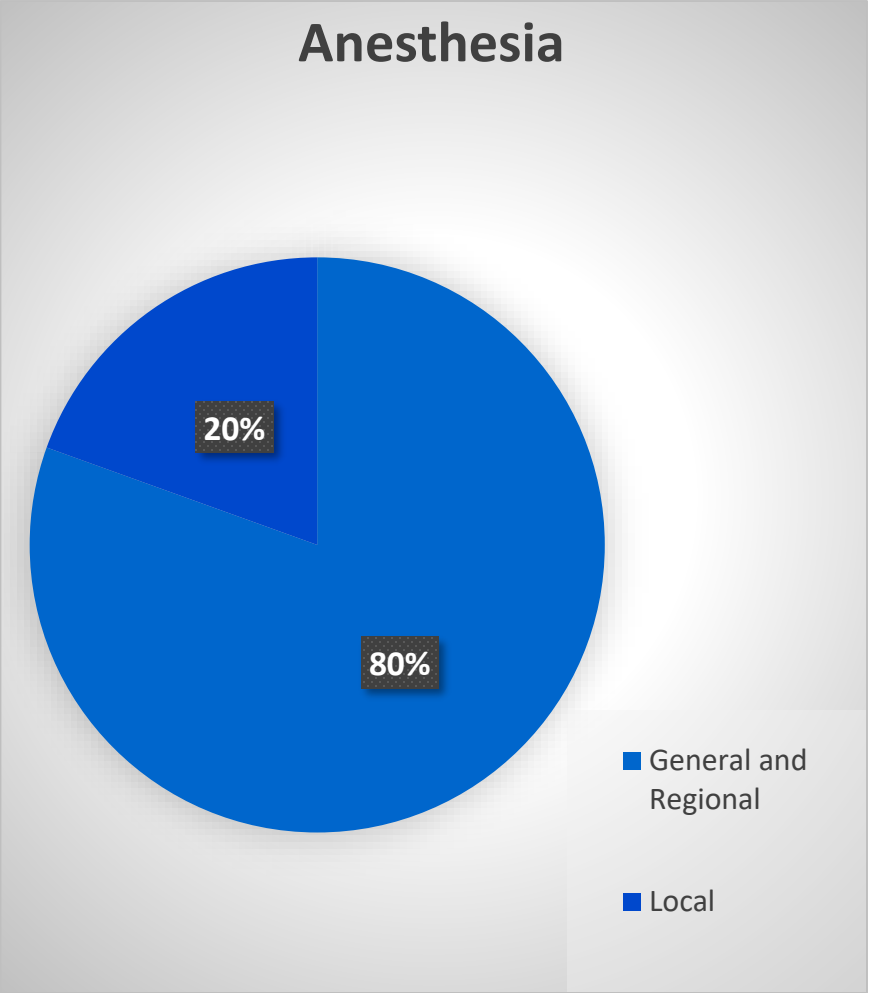
Trends in Carpal Tunnel Surgery



An Online Survey of Members of the American Society for Surgery of the Hand

10 questions sent to members of ASSH (N=2413)
30% (716 hand surgeons) response to the surgery

86,687 CTR during 5-year time period
from 2007 to 2011



Conclusions

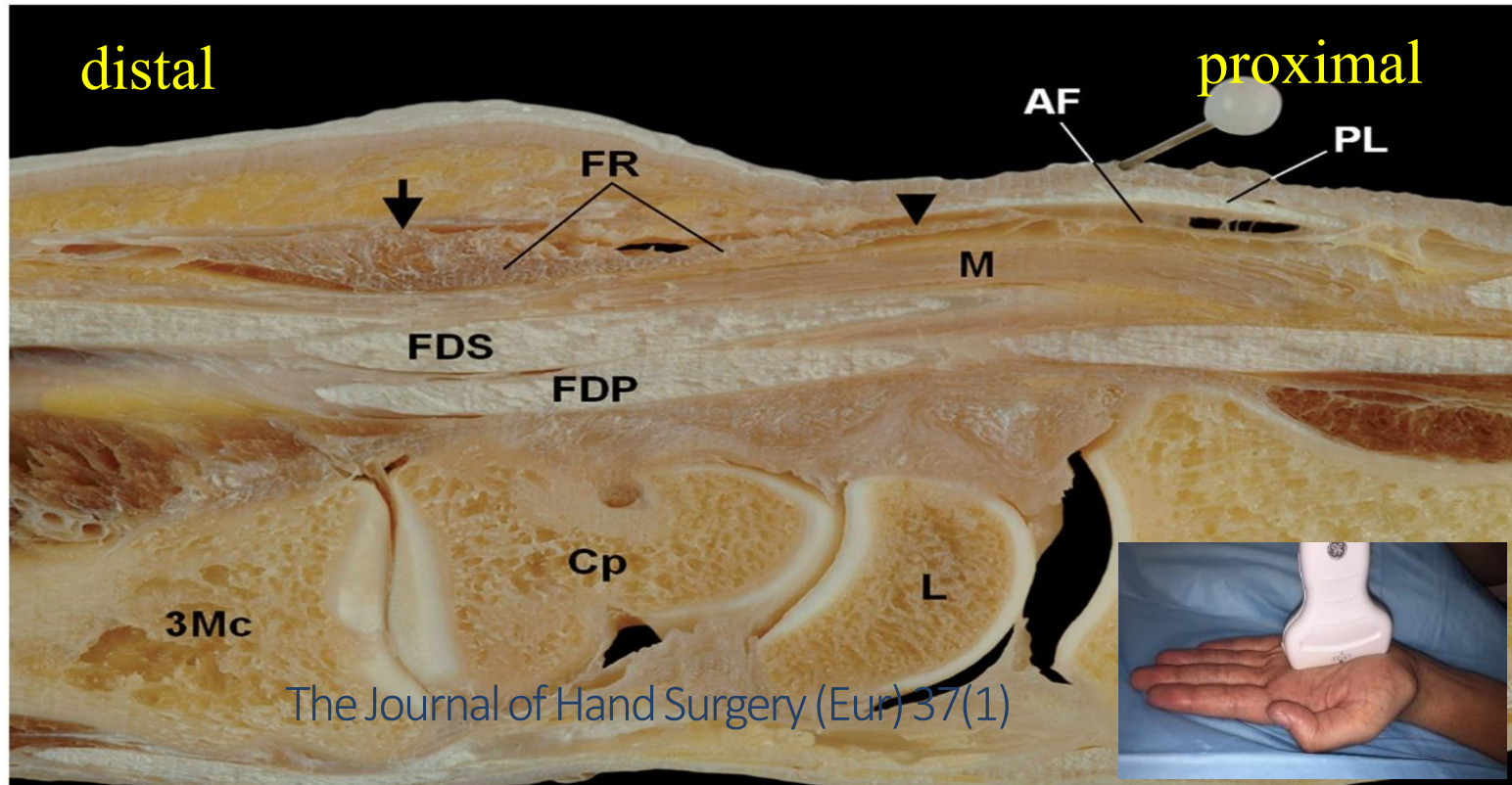
- In the US, OCTR under local anesthesia is the most cost-effective way
- Only a small fraction of CTR procedures done with OCTR, a potential for significant health care cost savings
- Saves \$2.3 billion over next decade
- Savings increase to about \$3.6 billion per decade if all CTR with open and local anesthesia

Mini open



First TCTR Patient, 75 yo. 4/8/15 (R), 4/13/16(L)

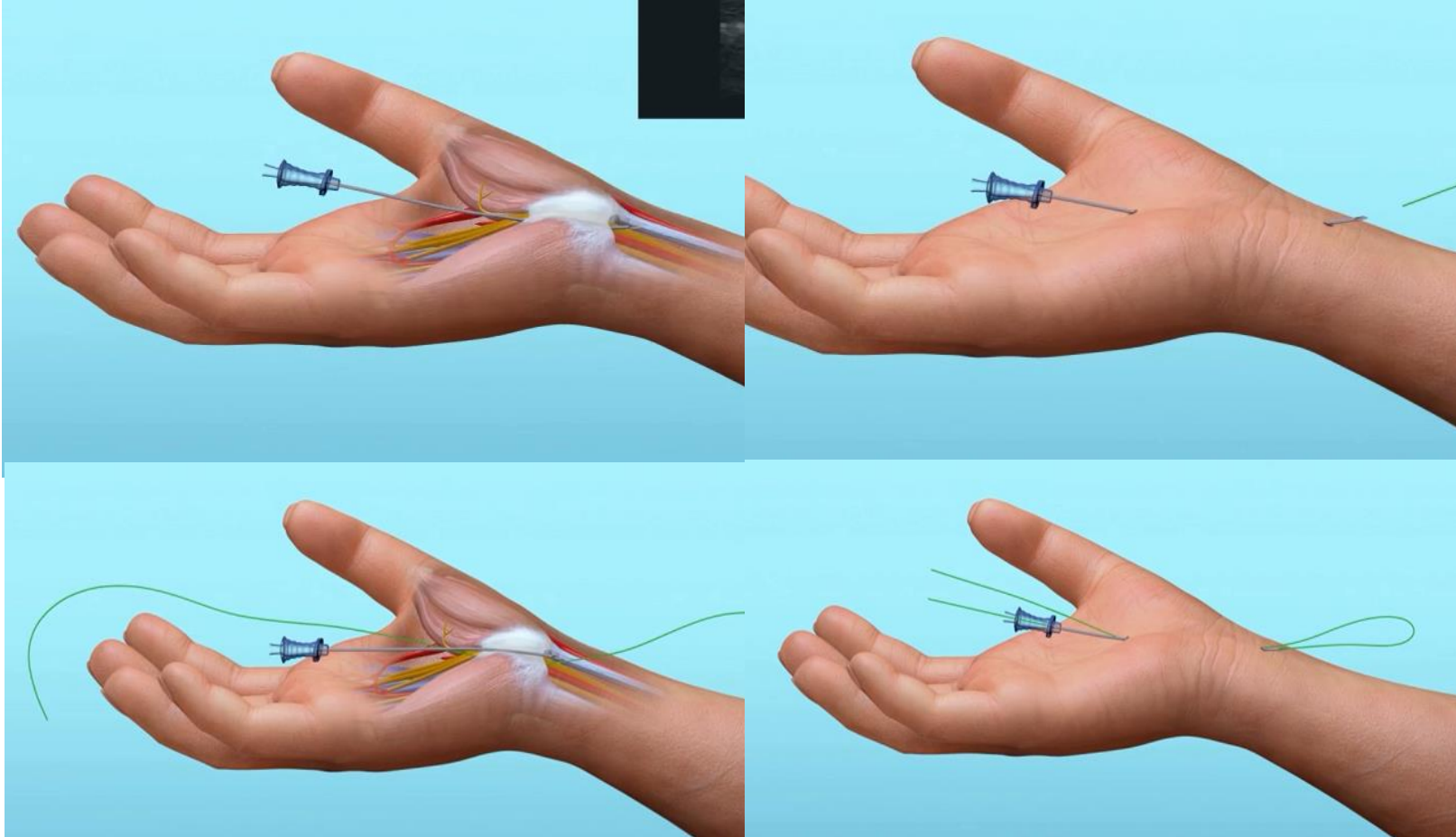


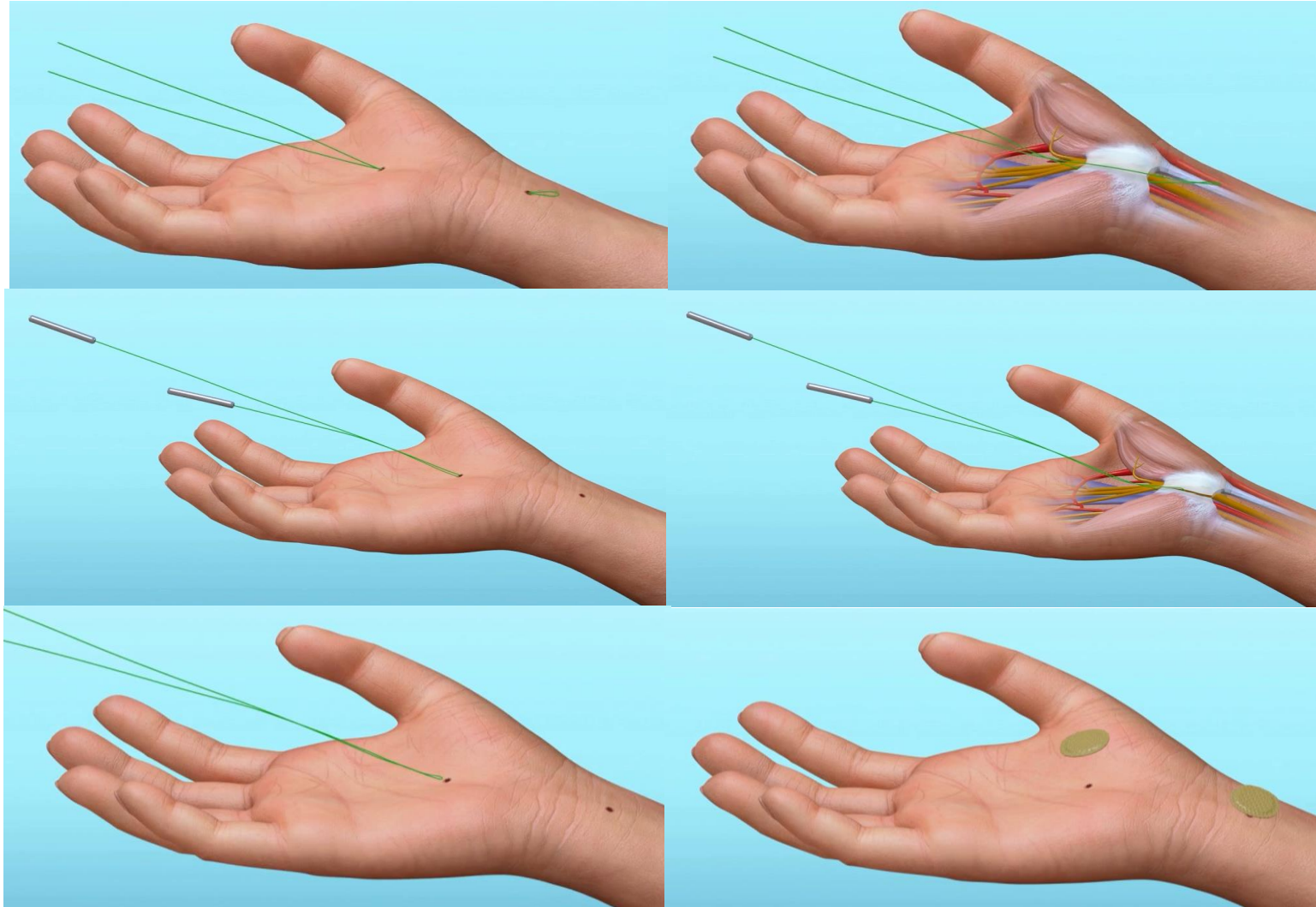


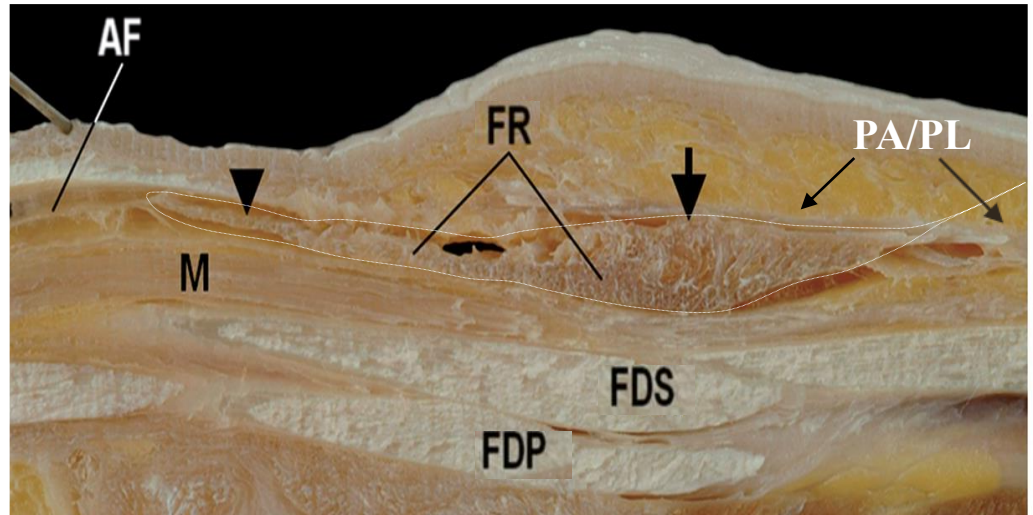
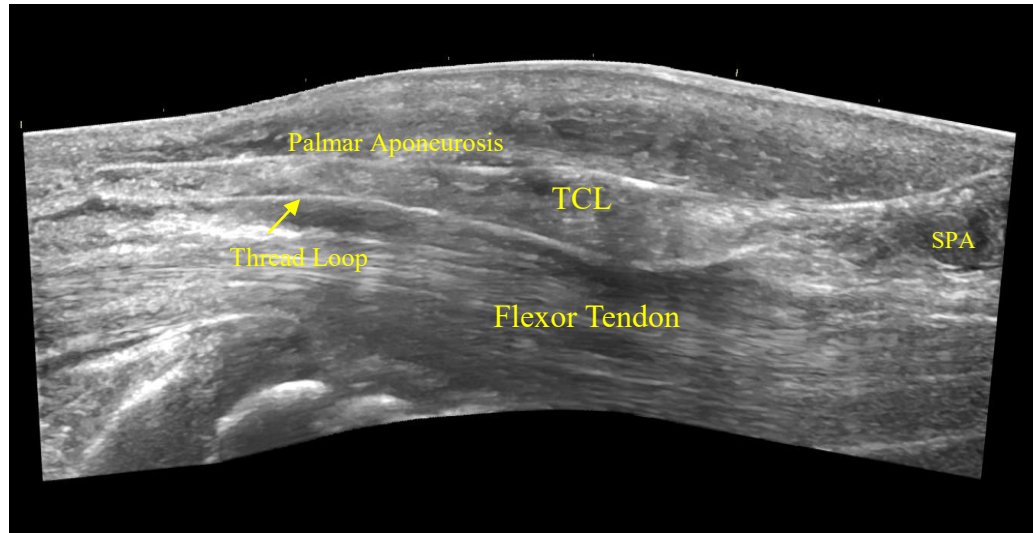
The Journal of Hand Surgery (Eur) 37(1)

Current limitations

- **Traditional open surgery,** Effective but invasive
- **Endoscopic surgery,** Less invasive but more technically challenging, more expensive, higher complication rates, still require a surgical incision







Thread Carpal Tunnel Release: Guo Technique

1. TCTR is a scalpel-less, ultra-minimally invasive technique for CTR, developed by Drs. Danzhu Guo and Danqing Guo at BayCare Clinic.
2. The procedure is safe, highly effective, and has yielded consistently successful results in 1000+ cases.
3. With ultrasound guidance, the transverse carpal ligament is looped and cut by a piece of thread, removing pressure from the nerve.
4. The thread is easily routed in the hand using a needle with only two punctures as the entry and exit points.
5. The technique ensures that the division happens only inside the loop of thread around the target without injuring adjacent tissues or nerves, ensuring the best possible patient outcome.

Animation Video of Thread Carpal Tunnel Release

Thread Carpal Tunnel Release

A new technique of minimally invasive surgery

Danzhu Guo, MD
BayCare Clinic
Green Bay, Wisconsin

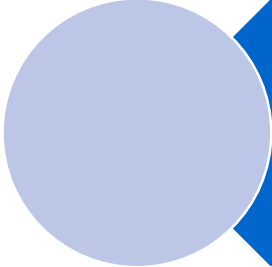
Danqing Guo, MD
BayCare Clinic
Green Bay, Wisconsin

Video of thread carpal tunnel release

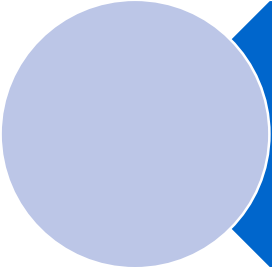
Guo Technique

Thread Carpal Tunnel Release

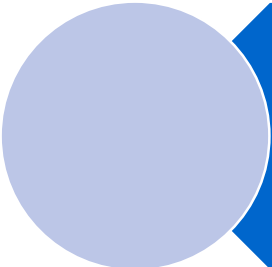
Advantages:



Fast Recovery: Patients able to return to normal activities in 1-2 days

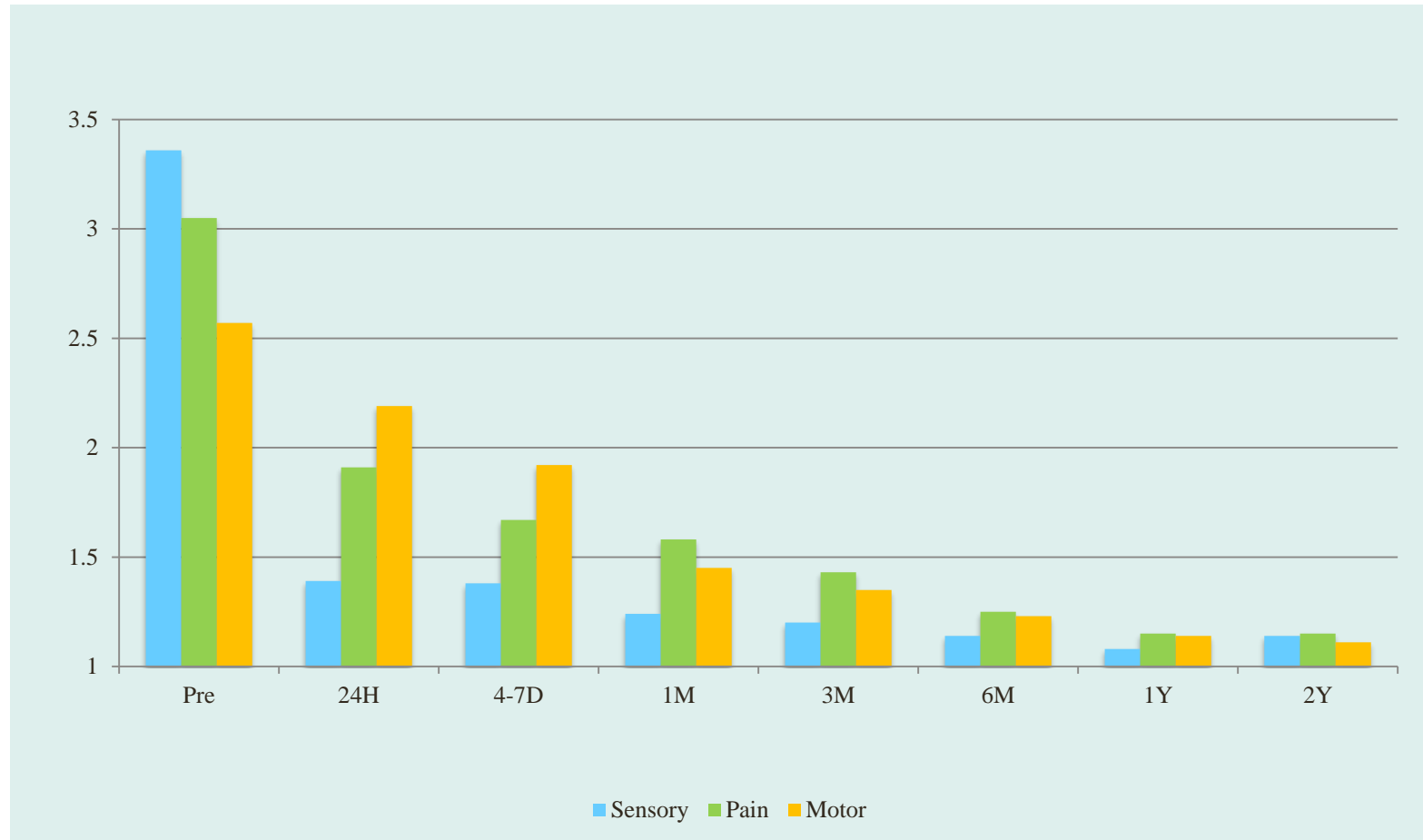


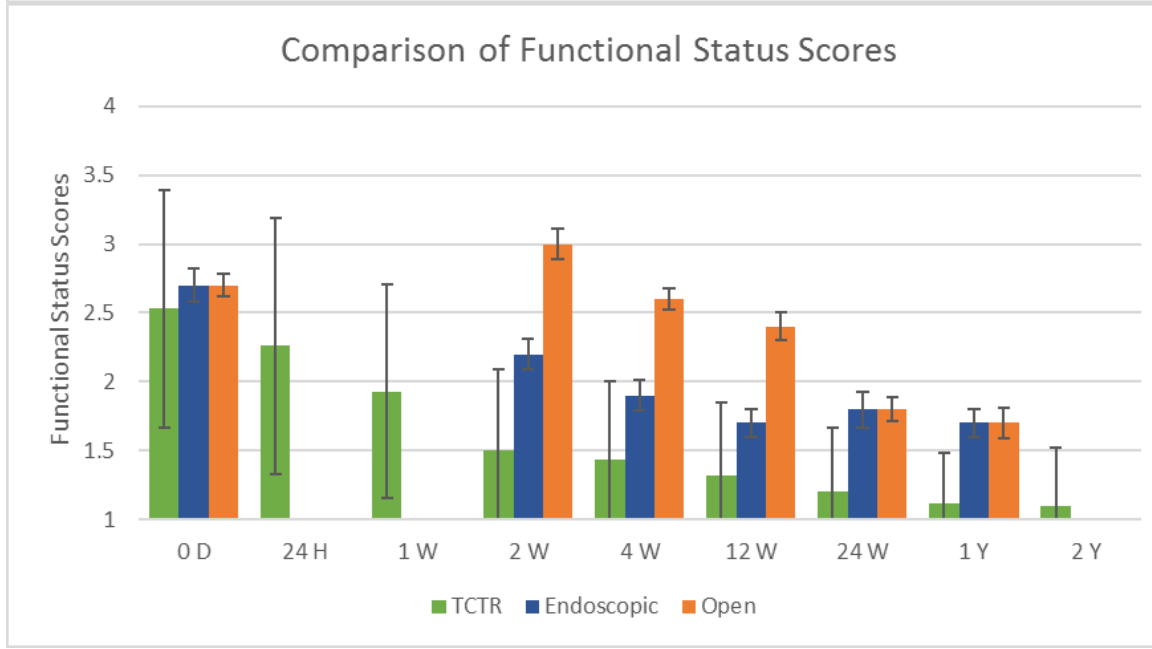
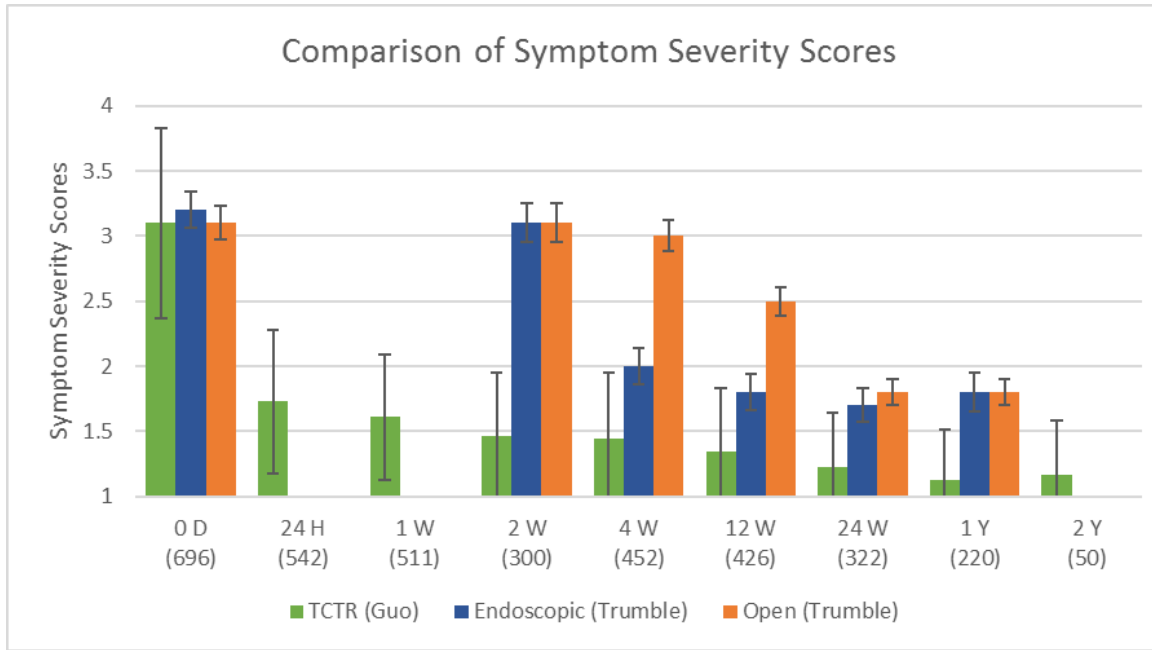
Low Risk: Procedure is ultra minimally invasive, with no scalpel or surgical incisions



Convenient: Performed in the office with local anesthetic, and takes ~10 minutes

TCTR Results, 1021 case 9/28/18





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DOI 10.1007/s11552-014-9656-4

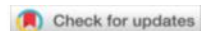
SURGERY ARTICLES



A non-scalpel technique for minimally invasive surgery: percutaneously looped thread transection of the transverse carpal ligament

Danqing Guo · Yu Tang · Yizheng Ji · Tiansheng Sun · Joseph Guo · Danzhu Guo

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Surgery Article

A Cadaveric Study of the Thread Trigger Finger Release: The First Annular Pulley Transection Through Thread Transecting Technique

Danqing Guo¹, Danzhu Guo¹, Joseph Guo², Logan C. McCool³, and Brionn Tonkin³

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Article



A Clinical Study of the Modified Thread Carpal Tunnel Release (TCTR)

Danqing Guo¹, Danzhu Guo¹, Joseph Guo², Steven C. Schmidt¹, and Rachel M. Lytle¹

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1-8
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ARTICLE IN PRESS

SCIENTIFIC ARTICLE

A Cadaveric Study for the Improvement of Thread Carpal Tunnel Release

Danqing Guo, MD,* Danzhu Guo, MD,* Joseph Guo, PhD,†
Daniel G. Malone, MD,‡ Nathan Wei, MD,§ Logan C. McCool, DO||

Acta Neurochir
DOI 10.1007/s00701-017-3203-3

REVIEW ARTICLE

An update on addressing important peripheral nerve problems: challenges and potential solutions

Wilson Z. Ray¹ · Mark A. Mahan² · Danzhu Guo³ · Danqing Guo³ · Michel Kliot⁴

McCool L, Kliot M, Guo D. J Neurol Neuromed (2017) 2(10): 6-8
www.jneurology.com



Mini Review

Open Access

A Review of Advances in Carpal Tunnel Release

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³BayCare Clinic, Green Bay, WI 54303, USA

NEW DEVELOPMENTS ON THE HORIZON

SUNDERLAND SOCIETY MEETING

STANFORD, CALIFORNIA

MARCH 3-6, 2018

Scientific Session VI

8:15 am - 10:00 am

Chairs: Lynda Yang and Eric Zager

8:15 am A Clinical Retrograde Study Of The Effectiveness And Safety Of Thread
Carpal Tunnel Release (Tctr)

Danzhu Guo

8:30 am A Cadaveric Study Of Thread Cubital Tunnel Release

Danqing Guo

A Clinical Retrograde Study of the Effectiveness and Safety Of Thread Carpal Tunnel Release (TCTR)

Danzhu Guo, Danqing Guo, Rachel Lytie, and Steven Schmidt

Baycare Clinic, Green Bay, WI, USA; danzhuguo@gmail.com

Introduction: Thread Carpal Tunnel Release (TCTR) has been studied previously with cadavers and in the clinic at a small scale. The aim of this study is to evaluate the safety and efficacy of this technique for longer term and at a larger scale.

A Cadaveric Study of Thread Cubital Tunnel Release

Danqing Guo, Danzhu Guo, Logan McCool, Alex Senk, Brionn Tonkin, and Michel Kliot

Pain & Rehab Medicine, BayCare Clinic, Green Bay, WI, USA; danqingg@gmail.com

Introduction: The ultrasminimally invasive ultrasound guided thread cutting technique has been successfully applied for thread carpal tunnel release and thread trigger finger release. This cadaveric study was designed to test the surgical feasibility of performing a cubital tunnel release of the ulnar nerve across the elbow using the same ultrasminimally invasive technique. In addition, we wanted to verify adequate decompression of the ulnar nerve could be performed percutaneous complete with minimal or no collateral damage to important adjacent structures such as the sensory branch of the medial antebrachial cutaneous nerve.

Team Members



Danzhu Guo, MD
BayCare Clinic



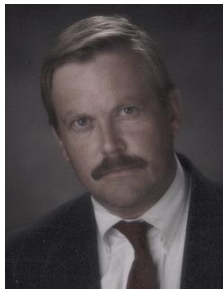
Michel Kliot, MD
Neurosurgery
Professor
Stanford University



Danqing Guo, MD
BayCare Clinic



Alex Shin, MD
Hand Surgeon
Professor
Mayo Clinic

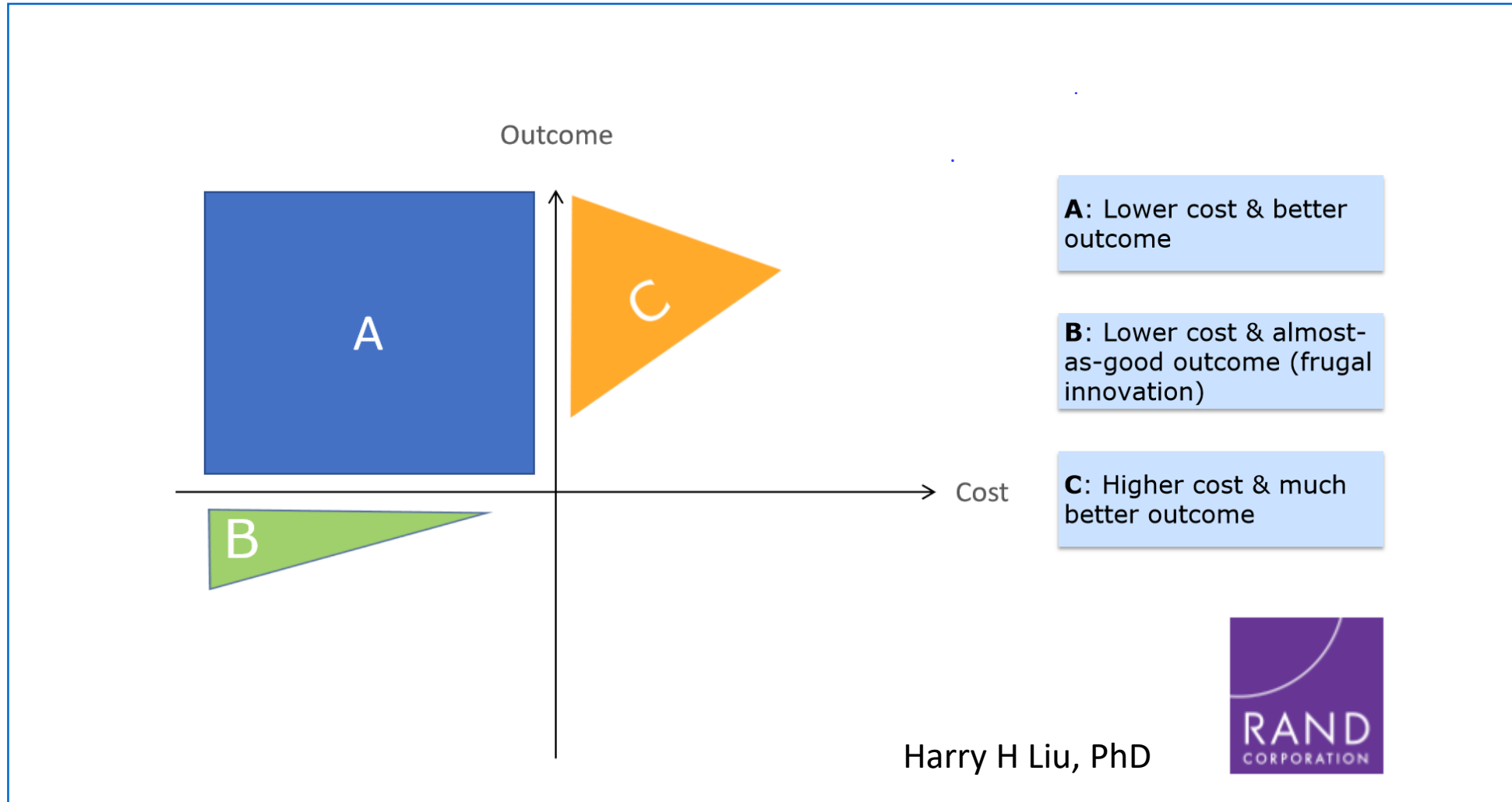


Max Ots, MD
Neurosurgeon
BayCare Clinic

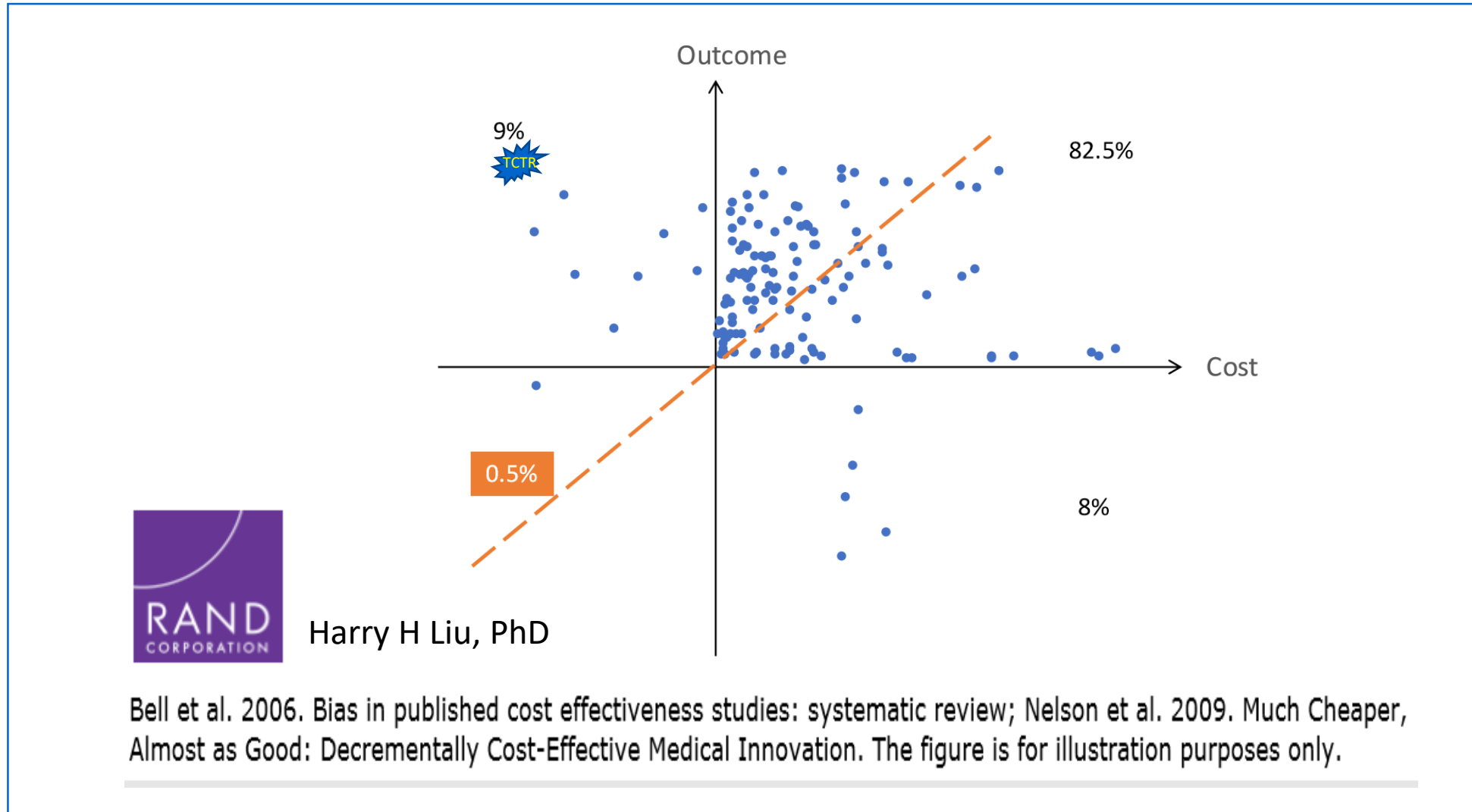


Rich Harrison, MD
Neurosurgeon
BayCare Clinic

There are three sweet spots for innovation on the value plane



This is how we innovated in the past



"Rarely does a new surgical procedure offer an elegant and compelling alternative to the old tried and true technique. The Thread Carpal Tunnel Release procedure, invented by the Guo brothers, is such an exception. This new surgical technique is a brilliant addition to the surgical armamentarium that accelerates patient recovery while improving clinical outcome."



Michel Kliot, M.D.
Neurosurgeon
Director of Peripheral Nerve Center
Stanford University

Will I need to take pain medication after the thread carpal tunnel release procedure?

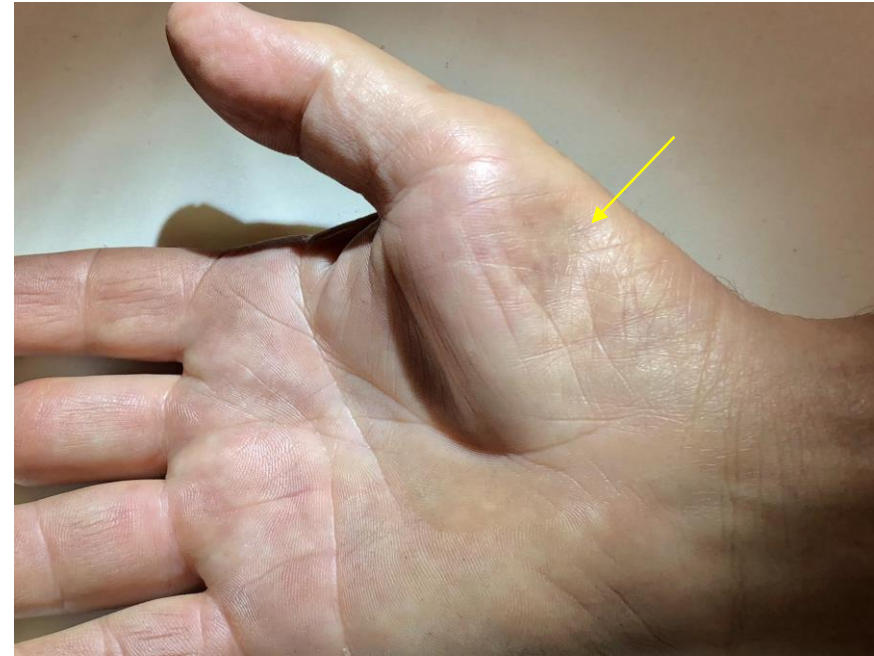
- No, you don't need narcotics for post procedure pain
- Tylenol and/or ibuprofen, rest and ice help manage any pain after the procedure

What exercises should I do after having the thread carpal tunnel release procedure?

1. Open and close the hand several times an hour to prevent the fingers from stiffening up.
2. Avoid doing a lot of repetitive activity, such as typing.
3. Otherwise, there is no physical or occupational therapy after the procedure.

If carpal tunnel syndrome not treated appropriately, what's going to happen?

Thenar
Muscle
Atrophy





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Thank You!

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