



CLINICAL EXERCISE SPECIALIST MANUAL

A Fitness Professional's Guide
to Training People with
CHRONIC DISEASE

J. DANIEL MIKESKA DHSc

CLINICAL EXERCISE SPECIALIST MANUAL

**A FITNESS PROFESSIONAL'S GUIDE TO
EXERCISE AND CHRONIC DISEASE**

BY J. DANIEL MIKESKA, DHSC

CLINICAL EXERCISE SPECIALIST MANUAL

(c) 2020 J. Daniel Mikeska, DHSC

The author and publisher claim no responsibility to any person or entity for any liability, loss, or damage caused or alleged to be caused directly or indirectly as a result of the use, application, or interpretation of the material in this book.

For permission to reprint portions of this content or bulk purchases,
contact the author at dmikeska@outlook.com

ISBN: 978-1-946533-98-2 hardcover

ISBN: 978-1-946533-99-9 eBook

Publishing Services provided by Niche Pressworks; Indianapolis, IN

<http://NichePressworks.com>

Printed in the United States of America



CHAPTER 18

COMMON DYSFUNCTIONS OF THE DISTAL ARM

By the end of this chapter you will understand:

- Anatomy
- Pathologies
 - o Epicondylitis
 - o Carpal Tunnel Syndrome
 - o De Quervain's Tenosynovitis
- Treatment options
 - o Early intervention
 - o Exercise intervention
 - Mobility/stability
 - Movement
 - What to avoid

Anatomy

The elbow is a hinge joint where the distal end of the humerus connects to the proximal ends of the ulna and radius. The elbow has two degrees of freedom; flexion and extension, and allows rotation, or pronation and supination of the forearm and wrist. The distal end of the humerus has two bony

prominences called *epicondyles*. The proximal end of the ulna connects to the medial epicondyle and the proximal end of the radius connects at the lateral epicondyle as shown in Figure 18.1. Because many of the muscles that cross the elbow connect to the shoulder or wrist, a dysfunction at one joint can often result in a dysfunction at the next proximal or distal joint.

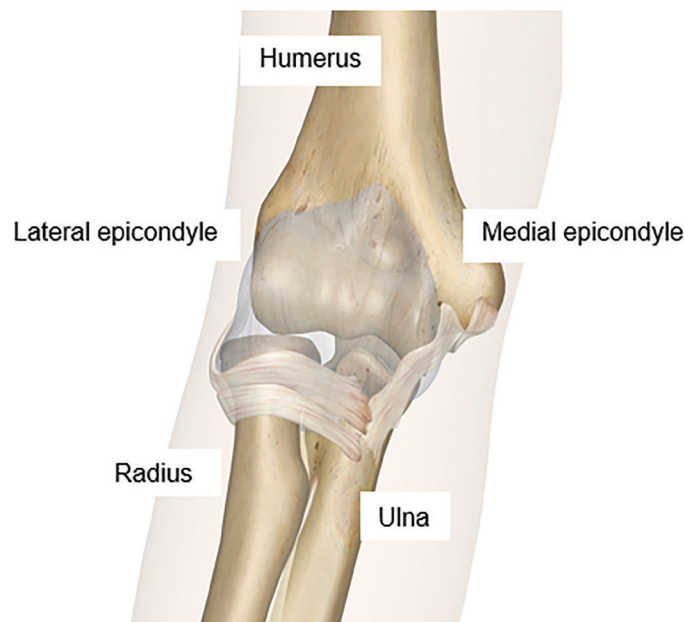


Figure 18.1 Elbow anatomy

Epicondylitis

Two common injuries to the elbow are lateral and medial epicondylitis, or tennis elbow and golfer's elbow that occur due to poor mechanics during activities with large force at the elbow joint. It is thought lateral epicondylitis results from the overuse of the wrist and forearm extensors and supinator muscles; however, the exact underlying cause is often difficult to discern (Ahmed et al., 2013). Often associated with tennis, other activities such as typing or playing a piano, carrying heavy weights, or repetitive elbow extension can also lead to lateral epicondylitis. Medial epicondylitis is often the result of repetitive eccentric loading during wrist flexion and forearm extension coupled with elbow valgus and pronation during activities such as golfing, overhead throwing, and swimming (Amin, Kumar, & Schickendantz, 2015). Both medial and lateral epicondylitis have historically been thought of as inflammatory responses, or tendonitis, the first phase of injury. However, repeated stress creates micro tears of the tendons resulting in tendinosis, a degenerative process characterized by structural breakdown and irreparable fibrosis or calcification (Ahmed et al., 2013; Amin et al., 2015).

The first line of treatment is to eliminate the movements that cause pain. When movements can be performed with little discomfort, the next step is to restore a pain free range of motion (ROM), followed by stability and mobility, and then movement. Similar to shoulder dysfunction, the elbow and wrist can also be affected by scapular dyskinesis. Therefore, it is prudent to assess the scapula and correct any dysfunctions as shown in Table 17.3. Please see Table 18.1 for specific guidelines for restorative exercises for epicondylitis.

Carpal Tunnel Syndrome

Carpal tunnel syndrome (CTS) results from the compression of the median nerve in the carpal tunnel. The carpal tunnel is on the palmar side of the wrist. The floor and sides are made up of small carpal bones and cartilage, and the top is the transverse carpal, or palmar ligament (Figure 18.2). High-load, manual tasks, and repetitive pinching and finger tapping activities can create pressure in the carpal tunnel, causing swelling and edema (Ballesterio-Perez; 2017; Levinson, 2015; Oatis, 2017). The median nerve is one of three major nerves that innervate the forearm and hand (Figure 18.2). Entrapment of the median nerve in the carpal tunnel due to swelling can cause tingling, pain, numbness, and weakness in the hand and fingers (Oatis, 2017). Additionally, CTS is often bilateral as the swelling can be caused by obesity, diabetes, arthritis, or hypothyroidism (Burton, Chesterton, & Davenport, 2014).

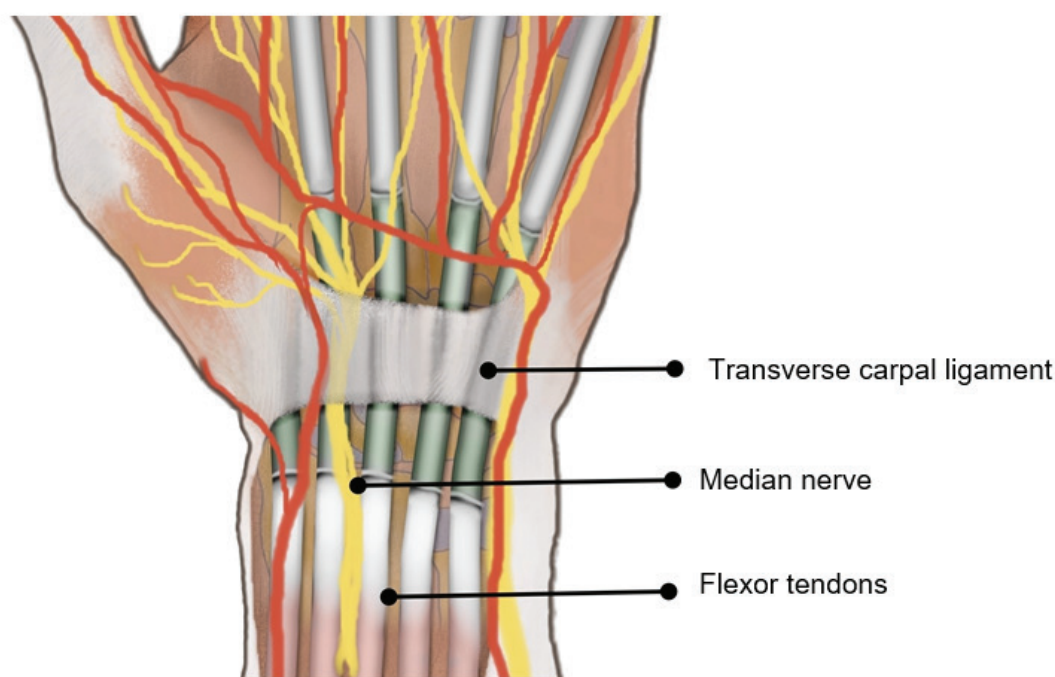


Figure 18.2 Carpal tunnel

On the ultraconservative end, CTS may resolve on its own in 12-15 months with splinting and avoiding aggravating activities. On the more aggressive end, surgery to release the transverse carpal ligament may be needed if conservative treatments fail. Non-steroidal anti-inflammatories (NSIADS), splints, and corticoid steroid injections are considered the most effective intervention for CTS. Regardless, restorative exercise should be part of a comprehensive treatment plan.

The goal of a restorative exercise program is to improve ROM while reducing pain. Although the research is limited, nerve and tendon gliding have been shown to be effective for mobilization, it is suggested they be incorporated during later stages of therapy or avoided altogether due to potential stretching of the median nerve (Ballesterio-Perez; 2017; Carlson et al., 2010; Levinson, 2015). All other exercise treatments should begin with isometrics, followed by isotonic, eccentric, and then concentric (Levinson, 2015). See Table 18.1 for specific guidelines.

De Quervain's Tenosynovitis

De Quervain's tenosynovitis or De Quervain's disease is characterized by pain at the base of the thumb at the first dorsal compartment (Howell, 2012; Levinson, 2015; Rabin, Israeli, & Kozol, 2015). Tenosynovitis is the inflammation of the fluid-filled sheath (the *synovium*) that surrounds a tendon, typically leading to joint pain, swelling, and stiffness. Considered an overuse injury, movements requiring tight gripping such as golf and fishing, or repetitive tapping such as texting and typing, as well as other activities where the hand twists and bends, such as knitting, can cause tissue micro-trauma that result in the thickening of the extensor retinaculum of the wrist, leading to pain and swelling. Finkelstein's test, when the thumb and ulnar are tightly grasped and the hand is quickly deviated resulting in sharp pain, is the best way to differentiate De Quervain's tenosynovitis from other conditions (Howell, 2012). The treatment protocol for De Quervain's tenosynovitis is similar to CTS and can begin once the inflammation is controlled. Table 18.1 indicates specifics.

Table 18.1

Recommended restorative exercises for distal arm dysfunction

Dysfunction	Early intervention	Stability/Mobility	Movement	Avoid	Sets/Reps
Lateral Epicondylitis	Stop painful movements Restore pain free ROM Restore coordination	Assess scapula Passive wrist flexion Resisted wrist extension with supported elbow in flexion External rotation Ts and Ys (prone and standing)	Multi-joint exercises that replicate ADLs Rows Shrugs Lat pull downs	Strenuous weightlifting	Low resistance, high reps. 3 sets 15-20 reps
Medial Epicondylitis	Stop painful movements Restore pain free ROM Restore coordination	Assess scapula Wrist extension and forearm supination with supported elbow in flexion	Multi-joint exercises that replicate ADLs Stabilization, pushing, and pulling movements	Isolation movements Full elbow extension Heavy bicep curls	Low resistance, high reps. 3 sets 15-20 reps
Carpel Tunnel	NSAIDS Corticosteroids Splinting Reduce aggravating activities	Wrist extension/flexion Radial and ulnar deviation Forearm pronation/supination Finger flexion/extension	Yoga Gripping exercises	Until pain subsides: Wrist flexion and extension >30 degrees Radial and ulnar deviation	

CLINICAL EXERCISE SPECIALIST MANUAL

De Quervain's Tenosynovitis	NSAIDS Corticosteroids Splinting Reduce aggravating activities	Wrist extension/ flexion Radial and ulnar deviation Forearm pronation/ supination Finger flexion/ extension	Gripping exercises	Until pain subsides: Wrist flexion and extension >30 degrees Radial and ulnar deviation
--------------------------------	--	--	--------------------	---

Ahmed, et al., 2013; Amin et al., 2015; Ballesterro-Perez; 2017; Carlson et al., 2010; Howell, 2012; Levinson, 2015; Rabin, Israeli, & Kozol, 2015

Discussion and application

1. What are some of the causes of epicondylitis and describe the major focus of restorative exercises and the rationale behind it.

References

- Ahmad, Z., Siddiqui, N., Malik, S. S., Abdus-Samee, M., Tytherleigh-Strong, G., & Rushton, N. (2013). Lateral epicondylitis: A review of pathology and management. *The Bone and Joint Journal*, 95-B(9), 1158-1164. <https://doi.org/10.1302/0301-620X.95B9.29285>
- Amin, N. H., Kumar, N. S., & Schickendantz, M. S. (2015). Medial epicondylitis: Evaluation and management. *Journal of the American Academy of Orthopaedic Surgeons*, 23, 348-355. <https://doi.org/10.5435/JAAOS-D-14-00145>
- Ballester-Perez, R., Plaza-Manzano, G., Urraca-Gesto, A., Romo-Romo, F., Atin-Arratibel, M. L., Pecos-Martin, D.,...Romero-Franco, N. (2017). Effectiveness of nerve gliding exercises on carpal tunnel syndrome: A systematic review. *Journal of Manipulative & Physiological Therapeutics*, 40(1), 50-59. <https://doi.org/10.1016/j.jmpt.2016.10.004>
- Burton, C., Chesterton, L. S., & Davenport, G. (2014). Diagnosing and managing carpal tunnel syndrome in primary care. *The British Journal of General Practice*, 64(622), 262-263. <https://doi.org/10.3399/bjgp14X679903>
- Carlson, H., Colbert, A., Frydl, J., Arnall, E., Elliot, M., & Carlson, N. (2010). Current options for nonsurgical management of carpal tunnel syndrome. *International Journal of Clinical Rheumatology*, 5(1), 129-142. <https://doi.org/10.2217/IJR.09.63>
- Howell, E. R. (2012). Conservative care of De Quervain's tenosynovitis/ tendinopathy in a warehouse worker and recreational cyclist: A case report. *The Journal of the Canadian Chiropractic Association*, 56(2), 121-127. Retrieved from <https://www.chiropractic.ca/jcca-online/issue/june-2012-volume-56-2/>
- Levinson, M. (2015). Musculoskeletal injuries of the upper extremity in J.S. Skinner, C.X. Bryant, S. Merrill, & D.J. Green (Eds), American Council on Exercise medical exercise specialist manual. San Diego, CA: American Council on Exercise
- Oatis, C. (2017). *Kinesiology: The mechanics and pathomechanics of human movement* (3rd ed.). Philadelphia, PA: Wolters Kluwer
- Rabin, A., Israeli, T., & Kozol, Z. (2015). Physiotherapy management of people diagnosed with de Quervain's Disease: A case series. *Physiotherapy Canada*, 67(3), 263-267. <https://doi.org/10.3138/ptc.2014-47>