



# Clinical Case Report Competition

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Honourable Mention

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The effects of massage therapy in pain management of carpal tunnel syndrome

## **THE EFFECTS OF MASSAGE THERAPY IN PAIN MANAGEMENT OF CARPAL TUNNEL SYNDROME**

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**Introduction:** Carpal tunnel syndrome (CTS) refers to median nerve compression within the carpal tunnel of the wrist. Impingement of the nerve may result in numbness, tingling, and weakness of the lateral three-and one-half digits. (Ludwig & Rattray, 2000).

The boundaries of the carpal tunnel are formed by carpal bones posteriorly and the transverse carpal ligament (TCL) anteriorly, also known as the flexor retinaculum. The TCL attaches to the pisiform, the hook of the hamate, the scaphoid tubercle and the trapezium. (Ludwig & Rattray, 2000).

Several structures pass through the carpal tunnel. The tendons of flexor digitorum profundus (FDP) and flexor digitorum superficialis (FDS), both share a common synovial sheath while passing through the tunnel. Flexor pollicis longus (FPL) tendon is enclosed in its own sheath, as it also passes through the canal. The median nerve lies superficial to the FDP and FDS tendons, and inferior to the TCL, as it moves through the canal. (Hertling & Kessler, 2006; Ludwig & Rattray, 2000).

### **Etiology:**

Only 50% of the cases of CTS are MD diagnosed. Diagnosis relates to local, regional or systemic causes. Local causes may include inflammation, trauma, tumors, and anatomical variations. Regional triggers may include osteoarthritis, rheumatoid arthritis, amyloidosis and gout. Systemic causes of CTS may include acromegaly, alcoholism, dermatomyositis, diabetes, haemophilia, hypothyroidism, menopause, leukemia, long-term haemodialysis, multiple myeloma, obesity, pregnancy, renal failure, sarcoidosis, scleroderma, and systemic lupus erythematosus (Aroori & Spence, 2008).

CTS is also related to highly repetitive flexion and extension motions of the wrist. CTS is a very common condition, affecting women more than men. Typically, subjects with occupations utilizing repetitive wrist motions are seen with more prevalence (Hertling & Kessler, 2006).

**Case Study:** The subject was a twenty nine year old female diagnosed by a medical doctor (MD) with CTS four years prior to the case study. The primary concern was progressive numbness, tingling, and then aching in the right wrist and hand after using the computer, writing, or lifting objects. The subject would typically spend 40 to 50 hours per week at the computer desk while working at home. A custom wrist splint issued by her physician was consistently worn during work times.

**Methods:** The treatment plan consisted of five fifty-minute massage treatments over six weeks with one subject with CTS. A consistent treatment protocol of Swedish, myofascial, and joint play techniques were utilized in all treatments.

The patient was given the following exercises from Hertling & Kessler, (2006). In the nerve gliding exercise, the patient was asked to move sequentially through the steps until numbness, tingling or weakness was felt. At the point of experiencing neurological symptoms, the patient alternated between the step of comfort and discomfort for 5 to 30 seconds. The sequence was recommended three times per day.

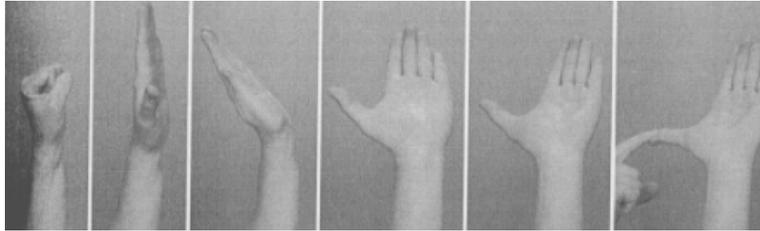


Figure 1: Nerve gliding exercise for mobilization of the median nerve. (Hertling & Kessler. Management of Common Musculoskeletal Disorders – Physical Therapy Principles and Methods. Philadelphia, PA: Lippincott Williams & Wilkins, 2006.)

In the tendon gliding exercise, the patient was asked to move through the sequence ten times. If there was no pain present, the exercise was increased to flexion and then extension of the wrist. The sequence was recommended three times per day.

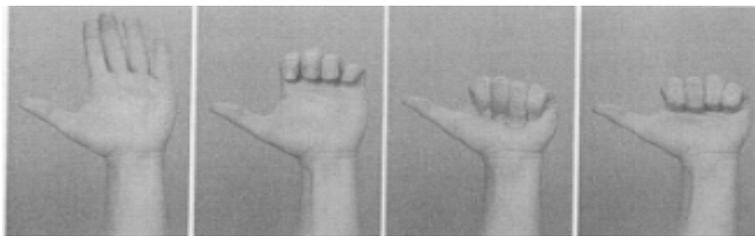


Figure 2: Tendon gliding exercises for tendons passing through the carpal tunnel. (Hertling & Kessler. Management of Common Musculoskeletal Disorders – Physical Therapy Principles and Methods. Philadelphia, PA: Lippincott Williams & Wilkins, 2006.)

**Assessment:** Phalen's, Phalen's Reverse, and a pain scale, corresponding to the Melzack (1975) scale of 0 to 5 were utilized to measure changes before and after each treatment. The McGill/Melzack Pain Questionnaire (1975) and The Carpal Tunnel (Median Nerve) Function Disability Form (Levine, et al, 1993) were also included for additional assessment before treatment one and after treatment five.

**Research Findings:** Two articles were referenced for treatment protocol. Tsao (2007) conducted an empirical study on the effectiveness of massage therapy and chronic non-malignant pain conditions. According to Field, et al (as cited in Tsao, 2007, Section 4, para. 14) 16 patients with CTS were assigned randomly to a control group or massage group. The massage group received 15 minutes of massage, once a week for 4 weeks. For homecare, the patients were also instructed to treat themselves daily with self-massage. The massage group reported pain by using a visual analog scale of 0 through 10. A final mean reduction in pain of 3.2 over the control group at 0.8 was recorded. Grip strength, anxiety, depression, and MD clinical assessments also showed a reduction in symptoms over the control group.

And secondly, in the treatment of pain caused by the sciatic nerve, Jewel & Riddle (2005) used a Physical Component Scale-12 (PCS –12) to note meaningful improvements of 14 points or more reported by patients. A total of 473 out of 1804 patients received physical therapy treatments and reported a true change in improvement. Massage techniques involving connective tissues, rated at an improvement of 22.2%. Myofascial release reported an increase of 19.5%. Joint mobility interventions, which included manual mobilizations and joint range of motion exercises, reported improvements of 23.5%. Flexibility exercises or any interventions that increased soft-tissue flexibility, reported an increase of 65.1%. And postural exercises resulted in a 45% meaningful increase. According to the article authors, “therapists should consider increasing their use of joint mobility and exercise interventions,” (Jewel & Riddle, 2005, Section 5, para.1) in the case of sciatic nerve pain.

**Treatment Goals:** The primary treatment goal was to decrease the pain from CTS in the right wrist and hand. Pain was addressed by decreasing myofascial adhesions and trigger points (TrP’s) while utilizing the Melzack (1975) pain scale.

A secondary goal was to increase the patient’s range of motion (ROM) in radial deviation (R&L). ROM was addressed by treating hypertonic muscles, decreasing myofascial adhesions and TrP’s. After further examination of the ROM data points, it became apparent that the patient would also benefit from an increase in wrist extension.

Another goal of increasing strength was noted from the resisted range of motion tests (RROM). Once again, under closer assessment of the data points, an increase in wrist flexion, extension, and radial deviation needed to be addressed. Increasing strength was addressed in the tendon and nerve gliding exercises for homecare.

And finally, patient education was also a goal for this patient. Since the nature of the condition was exacerbated by posture and overuse, it was essential for this patient to know how she contributed to CTS in her daily life.

**Results:** Data regarding massage therapy, pain and CTS in this study included utilizing Phalen’s and Phalen’s Reverse tests. In both tests, prior to the first treatment, the subject tested positive and reported the worst pain at 3/5 PPI. After the last treatment, the subject tested negative and reported 0/5 PPI.

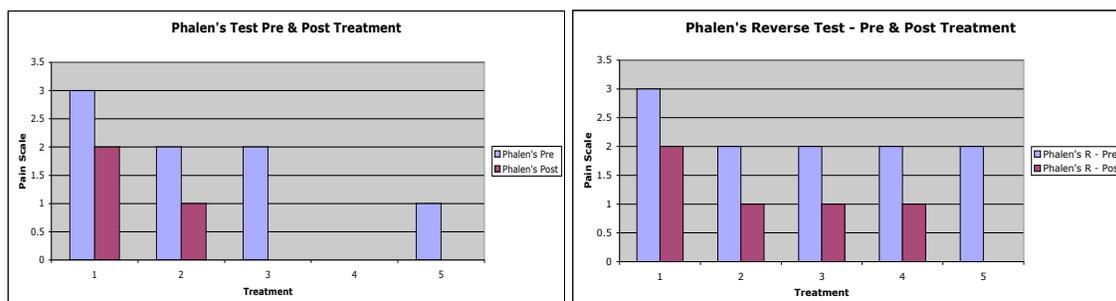


Figure 3: Phalen’s Test and Phalen’s Reverse Tests

The McGill/Melzack Pain Questionnaire (Melzack, 1975) was also utilized for assessment of pain. Prior to the first treatment, the subject reported a Pain Rating Index (PRI) of 28/78 points; PPI of 4/5; and 10 points of internal pain. After the final treatment, the patient reported a PRI of 10/78 points; PPI of 2/5; and 4 points of internal pain.

In the Carpal Tunnel (Median Nerve) Function Disability Form (Levine, et al, 1993) prior to the first treatment, the subject reported a mean of 2.7 points on the Symptom Severity Scale (SSS) and a mean of 2.0 points on the Functional Status Scale (FSS). After the final treatment, the patient reported a mean of 2.1 SSS and 1.8 FSS.

According to Field, et al (as cited in Tsao, 2007, Section 4, para. 14) grip strength for CTS improved after massage. In contrast, the patient in this study showed no change in mean measures for grip strength of the affected hand. Since this study included only one CTS subject, more research would be appropriate.

**Discussion:** Some variables came into play during the case study. For example, therapist communication could have been more specific and thorough. The patient began nerve and tendon exercises as instructed initially. When the patient began to feel positive changes from the exercises, she doubled the exercises at the beginning of week two. The subject continued with the same amount of exercise until the end of all treatments. Secondly, the patient began to incorporate hydrotherapy treatments during homecare exercises. However, after further questioning, the patient was not following proper hydrotherapy guidelines. After being instructed appropriately, the patient did not apply hydrotherapy daily, as noted in the homecare log.

Due to circumstances beyond control, additional variables surfaced. Treatments were originally scheduled within six to eight days between each visit. And on treatment five, the patient fell ill and was unable to attend the last session. The last session was rescheduled twelve days after treatment four. Also, after noting the patient's work hours from the homecare log, working hours were not consistent. They varied entirely from day to day.

And lastly, a very important aspect of the study was the presence of another impingement syndrome, as well as CTS. Since only one impingement was specifically addressed at the carpal tunnel, further treatments may be beneficial for addressing the patient's pain.

**Conclusion:** The results provided in this study showcase that massage therapy, including Swedish, myofascial and joint play techniques, can decrease pain caused by carpal tunnel syndrome. Specific homecare exercises and postural education also played a role in decreasing pain.

Suggested studies for the future include massage therapy effects on strength in carpal tunnel syndrome. Also, median nerve impingement of double crush syndromes was also indicated for further study. Additional treatments addressing both regions of impingement may provide an increase of benefit and prognosis to the subject's recovery.

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