

Original Articles

A Treatment for Carpal Tunnel Syndrome: Results of a Follow-Up Study

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ABSTRACT

Objective: This study was a follow-up evaluation of carpal tunnel syndrome (CTS) subjects based on objective and subjective measures utilizing a conservative treatment method. It was hypothesized that the CTS individuals would maintain their improvements over the course of a 6-mo period after treatments.

Design: The design used was a case control study in which the improvements of the CTS subjects were compared within themselves and with a matched comparison group. The treatments were performed at a private chiropractic clinic, and the objective and subjective measures were independently taken in an industrial engineering laboratory. All CTS subjects were volunteers from a random sample. Forty-three individuals were evaluated at the pretreatment period and in the 6-mo follow-up. Only 22 subjects returned for reevaluation. The treatment duration was not controlled.

Results: The results indicate that CTS subjects had maintained improvements in most of the objective measures and pain and distress ratings over the pretreatment level ($p < .05$) at 6 mo post-treatment. When compared to a matched comparison group, CTS-treated subjects demonstrated no significant differences ($p < .05$) in grip strength (for females), pinch strength, forearm pronation and supination forces, assembly task performance and pain and distress scores.

Conclusion: The results of statistical analyses indicate that CTS subjects can be treated and achieve a significant recovery to within normal comparative levels of non-CTS subjects in most subjective and objective measures. (J Manipulative Physiol Ther 1993; 16:125-139).

Key Indexing Terms: Carpal Tunnel Syndrome, Treatment, Chiropractic.

INTRODUCTION

Carpal tunnel syndrome (CTS) is one of the major forms of cumulative trauma disorder. Other terminology used to describe CTS includes occupational neuritis, partial thenar atrophy and median neuritis. CTS is generally attributed to insult, usually compression, to the median nerve within the wrist (1). Compression of the median nerve is in turn associated with application of force, as well as pressure from hard work surfaces and sharp edges on hand tools (2).

In 1985, Hiltz (3) reported that the average cost for

settling a CTS case was about \$3,500. In more severe cases requiring further treatment, including surgery, compensation and disability claims could range from \$30,000 to \$60,000 (3). These figures may be in need of updating, as a major manufacturing facility in the midwestern United States reports that average costs for CTS cases range from \$15,000 to \$18,000, not including lost work days or reduced productivity (4).

The precise incidence rate of CTS in industry is not known. Some conservative estimates state that 10% of all workers performing manual work may be affected (5). Armstrong (6) reported previous research documenting a plant-wide incidence rate of 2.6 cases per 200,000 work hours in an automobile upholstery facility. He further reported that the rate was as high as 25.6 cases on particular jobs within the same plant.

In the first phase of this study, Bonebrake (7) discussed in detail the currently understood and accepted causes and symptoms of CTS, and also the impact of CTS on industry. Further, this research group con-

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A Treatment for Carpal Tunnel Syndrome: Evaluation of Objective and Subjective Measures

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ABSTRACT

This study was designed to assess the efficacy of a proposed new and unique program relative to treatment and troubleshooting for diagnostic causes of carpal tunnel syndrome (CTS). Objective measures of anthropometry, strength, range of motion, muscle activity, and task performance, together with subjective ratings of pain were observed in a group of individuals diagnosed with CTS. These measures were compared to a control population showing no symptoms of CTS prior to undergoing treatment and following completion of the treatment program. Results indicate that individuals with CTS had significantly lower values on some strength, range of motion, and slower task performance

than did the control group. Ratings of pain and distress were also significantly higher than the controls, and in the literature the CTS group's values approached levels of chronic pain. Analysis of posttreatment cases revealed statistically significant improvements in several strength measures of up to 25% over pretreatment values. Significant improvement was also shown in several range of motion measures of up to 22%. Finally, a significant reduction of 15% in pain and distress ratings was demonstrated in the posttreatment cases. (*J Manipulative Physiol Ther* 1990; 13:507-520).

Key Indexing Terms: Carpal Tunnel Syndrome, Therapy, Chiropractic.

INTRODUCTION

Carpal tunnel syndrome (CTS) is one of the major forms of cumulative trauma disorder (CTD). Other terminology used to describe CTS include occupational neuritis, partial thenar atrophy, and median neuritis. CTS is generally attributed to insult, usually compression, to the median nerve within the wrist (1). Compression of the median nerve is in turn associated with repeated or sustained activities of fingers and hands, often combined with application of force, as well as pressure from hard work surfaces, and sharp edges on hand tools (2).

The carpal tunnel is named for the region of the wrist which contains the eight carpal bones, two of which

form a tunnel-like structure. Normally, 10 anatomic structures pass through the carpal tunnel (3). These are the four superficialis and four profundus tendons, the flexor pollicis longus tendon, and the median nerve. The nine tendons are enclosed within their respective synovial bursae. Located most superficially, the median nerve contains motor, sympathetic, and sensory fibers (3).

Although the innervation pattern varies slightly, the primary areas affected by the median nerve include most of the palmar side of the hand, the thumb, and all of the fingers except the ulnar side of the ring and small fingers (4). Under normal conditions, there is smooth movement of the nerve and tendons accompanying movements of the wrist. However, compression of the nerve will result from flexion and extension movements when the boundaries of the tunnel are compromised or when structures of the tunnel become enlarged (5).

Several pathological conditions may lead to the narrowing of the carpal tunnel (5). These include malaligned fractures, rheumatoid- or osteo-arthritis, and Paget's bone disease. Other conditions such as gout,

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