Utilizing Instrument-Assisted Soft Tissue Mobilization for Post-Operative Care Following Bilateral Carpal Tunnel Release in a Collegiate Long Distance Swimmer: A Case Report

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ABSTRACT

Background: A 20 year old collegiate long distance swimmer developed bilateral Carpal Tunnel Syndrome (CTS) and underwent bilateral carpal tunnel release. After surgery, the patient attended six therapy sessions at a physical therapy clinic specializing in hand rehabilitation and was cleared to return to full competition. Pre-participation examination revealed lingering symptoms. Upon follow-up examination, the patient reported pain as a 2 with swim activities and an 8 with weight-bearing activities on the 0-10 Numeric Rating Scale (NRS) with mild neurological symptoms. Active wrist extension was measured at 44˚ in her right wrist and 56˚ in her left wrist, while passive extension was 90° bilaterally. Resisted wrist extension was graded 2 out of 5 bilaterally. Phalen's Test and Tinel's Sign were negative, but wrist pain was reported with Reverse Phalen's Test. The patient was scored 0 out of 3 for the Trunk Stability Push-Up and Rotary Stability exercises within the Functional Movement Screen (FMS). The remainder of the physical examination was unremarkable and the patient reported an initial score of 26 on the Disablement in the Physically Active Scale (DPAS). **Differential Diagnosis:** Anterior interosseous nerve syndrome, C6 radiculopathy, Pronator syndrome. **Treatment:** Therapy included 11 non-consecutive treatment sessions of Instrument-Assisted Soft Tissue Mobilization (IASTM) with motion, followed by three passive one minute stretches and ice application. The first three IASTM treatments were performed during isometric contraction of the wrist extensor group. During these treatments, the average per treatment increase in active wrist extension was 12.33° bilaterally, with an average of 4.16° being maintained from one treatment session to the next. The patient's reported pain was a 2 with a DPAS score of 27. The next two IASTM applications were performed during concentric contractions and produced an average per treatment increase in active wrist extension of 9.33° bilaterally, with an average of 6.16° being maintained from one treatment session to the next. The patient's reported pain was a 1 with a DPAS score of 22. IASTM was then applied during eccentric muscle contractions of the wrist extensor group for the remaining six treatment sessions. These treatments produced an average per treatment increase in active wrist extension of 5.4° bilaterally, with an average of 1.9° being maintained from one treatment session to the next. The patient reported a resolution of both pain and neurological symptoms. At final examination, 40 days after initial evaluation, the patient's NRS score was 0 and the DPAS score was 7. Active wrist extension had returned to within normal limits (86˚ in the left and 80˚ in the right), resistive wrist extension was a 4+, and the FMS Trunk Stability Push-Up score was a 3, with a Rotary Stability Score of 2. The only category of the DPAS that still affected the patient was "well-being" and the patient was discharged at this time. Follow-up examination one month later indicated maintenance of the final measurements and a continued resolution of symptoms. **Uniqueness:** Relatively little to no literature exists on using IASTM during conservative or post-surgical treatment of CTS in young athletes. This case illustrates the benefits of using both clinician and patient based outcome measures to determine the effectiveness of a therapeutic intervention in meeting the needs and goals of the patient to return asymptomatic to competition. **Conclusions:** As clinicians, it is important to utilize outcome measures in returning a patient to activity or discharging them from care. The use of IASTM with motion produced clinically significant improvement across clinician and patient outcome measures and allowed her to successfully compete in her collegiate season.

INTRODUCTION

Carpal tunnel release surgery may lead to upper extremity deficiencies in range of motion, muscle function, athlete performance and furthermore production of pain. These deficiencies can result from scar tissue formation and adhesions post-surgery. Pain, a decrease in range of motion, and muscle dysfunction can inhibit athletic performance. Thus, outcomes for determining when a patient can complete general activities of daily living and athletic activities must be utilized. Soft tissue mobilization techniques can be utilized to reduce scar tissue, decrease pain, and restore function.

Instrument Assisted Soft Tissue Mobilization (IASTM) is a non-invasive therapeutic technique used to aid in the scar tissue break down and absorption, fascial mobilization, and improved tissue healing. Técnica Gavilán is a type of IASTM that incorporates motion into the IASTM treatment application to improve outcomes. By utilizing motion (e.g., stretching, muscular contraction, etc.) to increase and direct the mechanical load applied during treatment, it is theorized that improved clinician and patient outcomes will result.

The Disablement in the Physically Active Scale (DPAS) is an instrument used to analyze subjective information from the physically active patient. The DPAS analyzes a variety of measureable patient-reported outcomes, which include measures of impairments (IMPs), functional limitations (FLs), disability (DIS), and health-related quality-of-life (HRQOL). Each DPAS response is based off a 1 to 5 scale. A 1 represents no problem with the listed item for the patient, while a 5 represents a severe problem. The DPAS is scored on a scale from 0 to 64, with 16 points being subtracted from the final count.

Numerical Rating Scale (NRS) is used to measure the patient's intensity of pain. The NRS is generally used before a treatment and after treatment to monitor the patient's perception of pain. Patients are asked to rate their pain on a 0 (no pain) to 10 (worst possible pain) point rating scale.
The Functional Movement Screen (FMS) is a systematic test designed to document movement patterns. The score is ranked from 0 to 3, with 0 being that the patient is unable to physically carry out the entire movement and a 3 being that the patient is able to complete the entire movement with correct form, posture, and technique.

Our purpose for this case report is to present the outcomes of using Técnica Gavilán to treat a patient post-bilateral carpal tunnel release surgery that presented with wrist flexor and extensor muscle mass dysfunctions.

CASE STUDY

A 20 year old collegiate long distance swimmer developed bilateral Carpal Tunnel Syndrome (CTS) and underwent bilateral carpal tunnel release. After surgery, the patient attended six therapy sessions at a physical therapy clinic specializing in hand rehabilitation and was cleared to return to full competition. Pre-participation examination revealed lingering symptoms. Upon follow-up examination, the patient reported pain as a 2 with swim activities and an 8 with weight-bearing activities on the 0-10 Numeric Rating Scale (NRS) with mild neurological symptoms. Active wrist extension was measured at 44˚ in her right wrist and 56˚ in her left wrist, while passive extension was 90° bilaterally. Resisted wrist extension was graded 2 out of 5 bilaterally as a manual muscle test (MMT). Phalen's Test and Tinel's Sign were negative, but wrist pain was reported with Reverse Phalen's Test. The patient was scored 0 out of 3 for the Trunk Stability Push-Up and Rotary Stability exercises within the Functional Movement Screen (FMS). The remainder of the physical examination was unremarkable and the patient reported an initial score of 26 on the Disablement in the Physically Active Scale (DPAS).

The patient received 11 treatments of Técnica Gavilán on non-consecutive days. The treatment consisted of a warm-up period followed by the application of Técnica Gavilán over the wrist flexor group, wrist extensor group, and the associated area of the carpal tunnel during isometric, concentric, or eccentric activities. Following the completion of Técnica Gavilán, three passive one minute stretches and ice application were used to terminate the treatment. The first three IASTM treatments were performed during isometric contraction of the wrist extensor group. The next two IASTM applications were performed during concentric contractions. IASTM was then applied during eccentric muscle contractions of the wrist extensor group for the remaining six treatments. NRS scores were taken prior to and following each treatment, while DPAS, MMT, and FMS scores were recorded weekly to evaluate the patient's progress.

RESULTS

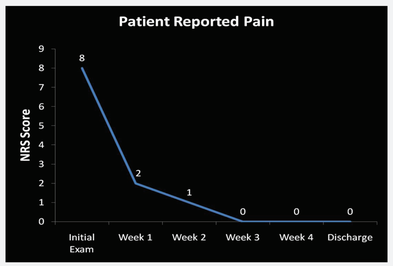
At final examination, 40 days after initial evaluation, the patient reported a resolution of her complaints, an NRS score of 0, and a DPAS score of 7. Active wrist extension had returned to within normal limits (86˚ in the left and 80˚ in the right) and her MMT scores were now being graded a 4+/5. On the FMS, her Trunk Stability Push-Up score was a 3 and the Rotary Stability Score was a 2. The only category of the DPAS that still affected the patient was "well-being" and the patient was discharged at this time. Follow-up examination one month later indicated maintenance of the final measurements and a continued resolution of symptoms.

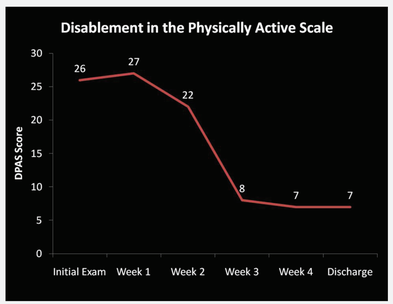
DISCUSSION

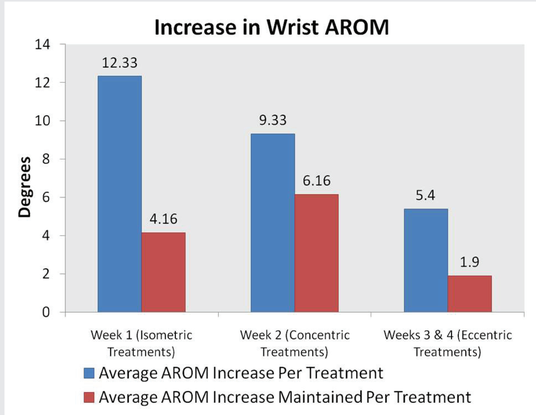
Minimal clinically important difference (MCID) or minimal clinically important change (MCIC) represents the change value that indicates that the participant has undergone a significant important change, as perceived by the patient. Using these numbers can aid clinicians in distinguishing those patients who are clinically improved versus those that are not. An NRS reduction from baseline of 2 points or 30% are associated with a clinically important change. For the DPAS, the MCID value for patients with acute injuries is 9 points, while the MCID was 6 points for patients with persistent injuries. Thus, if a patient with a persistent injury reports a 9-point or greater change on the DPAS and a 2 point reduction on the NRS, then in most cases, the patient has experienced a clinically significant change. The present case resulted in a decrease of 18 points on the DPAS and 8 points on the NRS within 3 weeks of initial evaluation indicating a clinically significant change. Additionally, active wrist extension was increased by 36° and 30° respectively on right and left wrists over the course of the 11 treatments bringing them to within normal limits.

CONCLUSION

As clinicians, it is important to utilize outcome measures in returning a patient to activity or discharging them from care. The use of IASTM with motion produced clinically significant improvement across clinician and patient outcome measures and allowed her to successfully compete in her collegiate season.







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