

Case Report

Managing carpal tunnel syndrome with modified neurodynamics approach: a case report

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ABSTRACT

Carpal tunnel syndrome is a median nerve entrapment neuropathy. The condition is noteworthy, as it has put a lot of burden in the economy. Although, a variety of treatments availed for the condition but there needs a new innovative protocol to treat the same. Carpal tunnel syndrome is having huge burden over the society hence; a peculiar protocol has to be found. The case introduces a 45-year-old supervisor working in a hospital who came to the physiotherapy outpatient department (OPD) with complaints of tingling sensation and numbness over the median nerve distribution area along with the pain at wrist, bilaterally. The assessment included special tests to check the sensitivity of median nerve in the carpal tunnel. The outcome measures numeric pain rating scale (NPRS) and Boston carpal tunnel syndrome questionnaire (BCTSQ) taken at definitive intervals to identify the efficacy of treatment. In this report, we aim to design a protocol for carpal tunnel syndrome using modified neurodynamics, which involves static opener, sliders and tensioners for median nerve.

Keywords: Case report, Carpal tunnel syndrome, Modified neurodynamics

INTRODUCTION

Carpal tunnel syndrome, a median nerve entrapment neuropathy under the fibrous sheath of flexor retinaculum. Carpal tunnel consists of nine flexor tendons and median nerve that is quite often compressed inside the tunnel 2-2.5 cm distal to its origin.^{1,2}

Pain, numbness, tingling over median nerve distribution area, loss of handgrip strength are the most common clinical features of carpal tunnel syndrome.² General population and employees having repetitive hand activities suffer around 2.7% and 7.8 % respectively.^{3,4} Also, it affects women (9.2%) more than men (6%) usually having the age group of 40-60 years.⁵

There are several risk factors for carpal tunnel syndrome such as pregnancy, lipoma, obesity arthritis etc., but the highest affected population is of diabetes (30%).⁶ The characteristic symptoms, physical examination and electro diagnosis studies are the basis of the diagnostic criteria suggesting mild, moderate and severe CTS.^{6,7} Various treatment approaches for management of CTS discussed earlier whether surgical or conservative. Mostly, in severe CTS patient's surgical treatment is opted over conservative treatment but for mild to moderate cases, it is the other way.⁸

Neurodynamics is an integrated approach, which focuses on mechanical interface and neural structures to improve nerve mobility and elasticity.⁹ There, is lack of evidence regarding the effectiveness of neurodynamics on CTS.¹⁰ Hence, there is need to set a peculiar protocol for the same

for pain and disability with high quality evidences and most of the evidences are of low level.

CASE REPORT

A 45-year male working as a supervisor in the hospital presented with tingling sensation and numbness over the area of the 1st, 2nd and 3rd digits i.e. median nerve distribution area along with the pain at wrist in the both upper limb which was gradual in onset and was persistent since 4-5 months. He reported that his symptoms usually aggravated during and only relieved by flicking of hands. He also reported that the same complaint was there 1-2 years back and was managed conservatively. He alleged that previously, after having the treatment he recovered fully with no tingling sensation and pain but now has developed the same complaints.

On observation, patient has an endomorphic build. There was no swelling and atrophy of thenar muscles and he was able to complete wrist range of motion but with grimace on his face suggesting pain during the movement.

On objective examination, the carpal compression test, Phalen's test conducted for carpal tunnel syndrome provisional diagnosis found to be positive for both the upper limbs along with the presence of flick sign. The neurodynamics testing for median nerve dysfunction (ULTT) was suggestive of tension dysfunction along with restriction in elbow range of motion, which was measured with the goniometer.



Figure 1: ULTT (for median nerve).



Figure 2: Static opener.

The patient's pain and disability reported on numerical pain rating scale (NPRS) and Boston carpal tunnel syndrome questionnaire (BCTSQ) that revealed more involvement of right hand than the left hand. The NPRS was reported 4/10 for left hand whereas it was reported 7/10 for right hand. The BCTSQ reported symptom severity scale (SSS) and FSS values at 13/55 and 8/45 respectively for left hand whereas for right hand SSS and functional severity scale (FSS) values at 19/55 and 10/45 respectively.



Figure 3: One-ended slider.



Figure 4: Level 1 tensioner.

Along with that, nerve conduction velocity performed for both the hands, which stated patient has bilateral carpal tunnel syndrome. Subsequently, patient advised for median nerve decompression surgery and was on medical management from past 2 years. He refused for the surgery, came to physiotherapy OPD, and advised to take physiotherapy for 2 weeks.

The physiotherapy treatment focused on reducing the tension dysfunction as suggested by ULTT through the modified neurodynamics approach with the goals of decompressing median nerve at carpal tunnel, better sliding in its mechanical surface and increase in viscoelasticity of median nerve.

The focused treatment started with the static opener for carpal tunnel median nerve decompression for one minute, which was repeated if any tingling sensation persists. For better sliding of median nerve within its

mechanical interface sliders were performed which started with two ended sliders followed by one ended slider. Furthermore, 4 levels of tensioners used with a goal to reduce tension and to increase the viscoelasticity of the nerve. Take home exercises, supervision under therapist were also included with the treatment.

DISCUSSION

The case report managed the carpal tunnel syndrome patient through the modified neurodynamics along with the general exercises, which reported in the improvement of the patient's condition. Patient reported to have increased elbow extension ROM at the end of the first day along with the significant improvement in NPRS and BCTSQ (FSS and SSS) after 5 days and at 2 week follow up. Hence, it was found that the combination of modified neurodynamics and general exercises were beneficial for the treatment of the carpal tunnel syndrome.

Neurodynamics session performed as 10 reps/3 sets with a rest of 10 seconds in between each sets for 5 days a week. Patient asked to do general physiotherapy exercises at home and precautions explained. In addition, he was not refrained from using dynamics night splint and pharmacological interventions.

The immediate effects of the approach came out to be promising, as patient has improved Elbow ROM. The post intervention findings taken after 5 days of continuous neurodynamics treatment and the outcome measures NPRS and BCTSQ showed significant improvement for both the hands. The NPRS was reported 1/10 for left hand whereas it was reported 3/10 for right hand. The BCTSQ reported Symptom severity scale (SSS) and FSS values at 7/55 and 8/45 respectively for left hand whereas for right hand Symptom severity scale (SSS) and Functional severity scale (FSS) values at 8/55 and 8/45 respectively.

Patient asked to performed general physiotherapy exercises for next few days and at 2 weeks, follow up it revealed that all the outcome measures maintained and improved.

CONCLUSION

In this report, we aim to design a protocol for carpal tunnel syndrome using modified neurodynamics, which involves static opener, sliders and tensioners for median nerve. This report concluded that the above-mentioned treatment is helpful in alleviating the symptoms of carpal tunnel syndrome.

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