Comparative Effects of Neurodynamics With and Without Wrist Splint in patients with Carpal Tunnel Syndrome

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ABSTRACT

Aim: To compare effectiveness of neurodynamics with and without wrist splint in patients with carpal tunnel syndrome. Study design: Randomized controlled trial. Settings: Farooq Hospital & Akhtar Saeed Trust teaching hospital, Lahore. Methodology: In present study 34 patients were randomly allocated into two groups in which each group contains 17 patients. Group A received combined treatment approach of neurodynamics and wrist splint while group B received only neurodynamics for two weeks. Improvement in functions and pain were recorded after 2 weeks. Initially baseline measurements were taken on DASH questioner andVAS. Present RCT study was carried out at Akhtar Saeed Trust Hospital, Lahore. Analysis was established through SPSS. Results: Independent sample t test was applied in present study of 34 patients as the mean difference was greater in group A in which combined treatment approach of wrist splint and neurodynamics were applied as compared to other group B in which only neurodynamics were applied. The p value is < 0.05 which shows results were significant. Results were more significant and superior in group A as compared to group B. Conclusion: Group A in which neurodynamics and wrist splint were used found to be more effective as compared to group B in which only neurodynamics were used. Keywords: Carpal tunnel syndrome; neurodynamics; wrist splint.

INTRODUCTION

Carpal tunnel is the narrow space which is present between smaller bones of hand and an important ligament of hand which is called transverse carpal ligament. Compression of median nerve occurs commonly at wrist which results in Carpal Tunnel Syndrome (CTS). It causes motor and sensory changes as a result of any pressure and over stretching of the median nerve as it passes through the narrow space in the wrist. Mediaan nerve mobility can also be restricted if the space of carpal tunnel decreases and contents of carpal tunnel enlarges. This results in the neurological symptoms that can travel down the wrist along the median nerve distribution. CTS can be classified into 3 grades such as mild, moderate and severe CTS. Mild and moderate CTS patients present with numbness and paresthesia in hand fingers but wrist functions are not effected but in severe CTS wrist activities are restricted. Its incidence rate is 1% and age ranges from 40 to 60. Its prevalence is more in females as compare to males. Prevalence of this syndrome in US population is 3.72% and its incidence is 139.4 females out of 100,000 and 67.2 males out of 100,000. There are many causes for this syndrome such as metabolic diseases, tendinitis, tendinosis, repetitive wrist activities, gripping activities, constant pressure over median nerve, fracture of carpal bones, poor posture, lesions of median nerve, any trauma, arthritis changes and pregnancy but many have idiopathic cause. The most common characteristics is tenderness and pain especially at night. There is decrease in pain and numbness after flicking the wrist. The pain is limited to median nerve distribution as it can spread to forearm and shoulder. Delay in treatment can result in permanent change such as sensory loss and muscle atrophy of Thenar muscles. This can result in limitation of activities of daily life as there is weakness and atrophy of muscles innervation by median nerve. Phalen's test and Tinel's sign is positive in this syndrome. Different treatment plans are given to patients in physiotherapy in order to protect the nerve wrist splint is used which keeps the wrist in neutral position. It is advised to use wrist splint at night as symptoms are more severe at night and it can be added along with conservative treatment. It is mentioned that wrist splint decreases the symptoms in 67%, TENS, laser, stretching exercises, cryotherapy, PNF techniques, Ultrasound therapy, tendon glides, nerve stretching exercises, carpal bones mobilization techniques, traction exercises and strength training can also be used. There are different techniques of nerve mobilization which includes nerve tension exercises and nerve glides. These treatments can result in decrease in pain, numbness, strength improvement and ROM improvement. Tendon glides prevents adhesion formation and compression in carpal tunnel. Kinesio taping can also be used for same purpose. When conservative treatment fails surgery is recommended in severe cases but there can be surgery related complications and failure. Nonsurgical treatment also includes NSAIDs and Steroids.

METHODOLOGY

In this study 34 patients were selected and were divided into two groups in such a way that each group contains 17 patients according to Randomization Concealment method by the usage of random convenient sampling. This study was carried out at Department of Physiotherapy of Akhtar Saeed Trust Hospital. First group received combined treatment approach of neurodynamics and wrist splint while second group received only neurodynamics. There is very limited literature which tells us about combined effect of splint along neurodynamics so present study showed that combined intervention is more effective as compared to neurodynamics alone. The aim of study was to look at the effects of soft tissue technique and neurodynamics on pain and pressure sensitivity.
test. Symptoms that persisted for at least 4 weeks. Those patients were excluded that have any previous surgery, older than 50 years of age, female gender, pregnancy, injection, any systemic disease. The DASH is the questionnaire that measures the functional limitation. The patients were wrist splint at night for 5 days in a week. This questioner was filled by the subjects before starting treatment and after giving treatment. The patients were followed up to two weeks and were treated for 5 days in a week with total 10 sessions. Comparison of results were established after a period of 2 weeks. In the end after filling questioner data analysis was established through SPSS. P value<0.05 in the study was mentioned and taken as significant.

RESULTS

Thirty four patients were taken in this study in which Group A has the mean age of 45.7±4.28 years and Group B has the mean age of 34.06±4.35 years. In Group A 6 males and 11 females were present while in Group B 3 males and 14 females were present. It was concluded that CTS is more prevalent in females as compared to males. In Group A 12 married and 5 unmarried were present and in Group B 8 married and 9 unmarried were present. 13 patients in Group A developed CTS in right hand and 4 in left hand while 12 patients in Group B developed CTS in right hand and 5 in left hand.

As in group A when mean paired difference was seen it was greater in group A in which combined treatment approach was used as compared to Group B in which only neurodynamics were used so first group of neurodynamics and splint found to be more superior as compared to second group in which only neurodynamics alone were used. Though independent sample t test baselines values for DASH were insignificant in both groups (P>0.05). In the end of 2 weeks treatment, there was significant difference in both groups but group A results were found to be more significant as compared to group B as p<0.05. Baseline values for VAS were insignificant as p=0.05 but after two weeks duration significant results were found in both groups but more significant results were found in first group as compared to second group. It was concluded that Group A in which neurodynamics and wrist splint were used found to be more effective as compared to group B in which only neurodynamics was used.

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DISCUSSION

There was a study conducted by Wolny and Linek 2019 in which 103 patients were included in the study. In this study the group that received neurodynamics with conventional physical therapy found to be more effective as compared to second group. They were treated twice weekly and there was 20 sessions. The same neurodynamics were included in the present study and was found effective in both groups.

In a study conducted by Goyal, Mehta et al. 2016 there were 2 groups. First group received conventional physiotherapy and second group received neural nerve mobilization techniques. 15 patients were included each group. In the end it was concluded that the group which included neural nerve mobilization found to be more effective as compared to other group. In the present study neurodynamics were included found to be effective.

RCT on 120 subjects was done by De Angelis, Pierfelice in which there were two groups. First group wore hand brace and second group wore wrist splint. Both splint and brace were worn at night for time period of three months. In the end it was concluded that both groups improved functionally. The same was found in present study that the group that included wrist splint found to be more effective as compared to other group in which only neurodynamics were used.

There was a study conducted by De-la-Llave-Rincon, Ortega-Santiago on 18 patients of CTS. Soft tissue mobilization was done at scalene muscle, aponeurosis of elbow(bicipital aponeurosis), pronator teres and hand ligament (transverse carpal ligament). In the end it was concluded that neurodynamics and soft tissue massage decreases the pain but does not decreases the pressure sensitivity.

In present study it was found that the results in both groups were significant but in group A in which wrist splint and neurodynamics were applied, found to be more significant as compared to group B in which only neurodynamics were applied.
CONCLUSION

This study ended with the conclusion that results were significant in both groups but combined treatment approach (neurodynamics and wrist splint) was more superior as compare to neurodynamics alone. Group A was more effective in decreasing pain and improving functional strength. When comparing both groups it was seen that group A gave more significant results as compare to group B.

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Ethical considerations: Subjects were told that there were known benefits of these maneuvers in reducing pain and improving functions of upper extremity. They were informed that were free to withdraw at any time during the process of the study and all data was kept confidential with subjects anonymous in present study.

REFERENCES