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Original Article

Role of Splint in Patients with Symptoms of Carpal Tunnel Syndrome

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Abstract

Background: Carpal tunnel syndrome is a common condition Encountered in the department of physical medicine and rehabilitation. Splinting wrist in patients with carpal Tunnel syndrome is good conservative management tool in patients specially who wake up at night. **Objective:** This study was conducted to assess the role of splint in patients with symptoms of carpal syndrome. **Methodology:** This was a quasi-experimental study. This study was conducted in the department of physical medicine and rehabilitation department at Dhaka medical college hospital during July 2006 t0 January 2007 time period. Patients were selected randomly from the outpatient department physical medicine and Rehabilitation of Dhaka Medical College, Dhaka, Bangladesh. Patients who had symptoms consistent with carpal tunnel syndrome that was numbness, tingling and burning sensation in the hand, duration of symptoms more than two weeks or more than three times in last six months, who were residents of Dhaka city and who were able to follow up regularly were included as study population. Patients were enrolled randomly into splinted and non-splinted group by odd and even number. Splinted group were treated by splint, drugs, ergomic training and exercise. Non-splinted group were treated by same drugs, ergonomic training and exercise only. The splint was a tailor made volar static wrist splint prepared by same orthoptist for every patient with splint. Outcomes were measured by Visual Analogue scale (VAS) and Levine Symptom Severity Scale (LSSS) at second fourth and six weeks follow up visits. The data were collected into splinted and non-splinted groups. **Result:** There were 51 hands in 34 patients enrolled for the study. Among them 26 were in the splinted group and 23 were in the non-splinted group. **Conclusion:** In this study splinted group showed significant improvement. [Journal of Science Foundation, July 2017;15(2):48-51]

Keywords: Role; splint in patients; carpal tunnel syndrome

Introduction

Carpal tunnel syndrome is a common condition encountered in the department of physical medicine and rehabilitation. Symptoms includes tingling and numbness of hand during activity and even sometimes at rest. Most of the patients improved conservatively by drugs, ergonomics, exercise and splint. Splinting wrist is useful (Werner et al., 2005). Conservative tool to manage symptoms. However, there is little evidence of using splint for relieving symptoms. This study was undertaken to assess the role of splint in patients with symptoms of carpal syndrome.

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Methodology

This was a quasi-experimental study. This study was conducted in the department of physical medicine and rehabilitation department at Dhaka medical college hospital during July 2006 t0 January 2007 time period. Patients were selected randomly from the outpatient department physical medicine and Rehabilitation of Dhaka Medical College, Dhaka, Bangladesh. Patients who had symptoms consistent with carpal tunnel syndrome that was numbness, tingling and burning sensation in the hand, duration of symptoms more than two weeks or more than three times in last six months, who were residents of Dhaka city and who were able to follow up regularly were included as study population. Patients with upper limb musculoskeletal disorder secondary to acute trauma, patients with acute onset stroke were excluded from this study. Sampling technique was purposive. Patients were enrolled randomly into splinted and non-splinted group by odd and even number. Splinted group were treated by splint, drugs, ergomic training and exercise. Non-splinted group were treated by same drugs, ergonomic training and exercise only. The splint was a tailor made volar static wrist splint prepared by same orthoptist for every patient with splint. Outcomes were measured by Visual Analogue scale (VAS) and Levine Symptom Severity Scale (LSSS) at second fourth and six weeks follow up visits. The data were collected into splinted and non-splinted groups. Analysis were done according to objectives with the help of SPSS programme. Comparisons were made by t test. P value less than or equal to 0.05 was considered statistically significant with 95% confidence interval. Significance for correlation were searched for.

Results

Socio-demographic Characteristics

Age distribution of study subjects were analyzed by decades. Mean age of splinted group was 41 years and that of non-splinted was 40 years. Man age of total patients were 41 years. Highest number of subjects were in the age group of 41 to 50 years (Table 1).

Table 1: Age Distribution of Study Subjects (n=51)

Age Group	Splinted	Non Splinted	Total
21 to 30 Years	3(0.0%)	6(12.0%)	9(18.0%)
31 to 40 Years	10(6.0%)	4(8.0%)	14(28.0%)
41 to 50 Years	6(12.0%)	10(20.0%)	16(33.0%)
51 to 60 Years	7(14.0%)	2(4.0%)	9(18.0%)
61 to 70 Years	0(0.0%)	1(2.0%)	1(2%)

In this study 88.0% were female and 12.0% were male. Male to female ratio is 1:7 (Table 2)

Table 2: Gender Distribution among the Study Population

Gender	Frequency	Percentage
Male	4	11.8
Female	30	88.2
Total	**34**	**100.0**

In this study highest subject from middle income group whose income between 5000 taka to 50,000 taka per month and lowest subjects from upper income group whose income above 50,000 taka per month (Table 3)

Table 3: Socio-Economic Distribution of Study Subjects (n=34)

Economic Classes	Splinted	Non Splinted	Total
Upper Income	2(6.0%)	1(3.0%)	3

Middle income	9(26.0%)	9(26.0%)	18
Lower income	6(18.0%)	7(21.0%)	13
Total	**17(50.0%)**	**17(50.0%)**	**34**

Upper Income >50,000/Month; Middle income between 5000- 50,000; Lower income >5,000

Clinical Characteristics

In the study, tingling of hands was found to be the most common symptom. Tingling was found in 63.0% cases in 31 hands. Pain was found in 41.0% cases among 20 hands. Numbness was detected in 22.0% cases in 11 hands. Weakness was found in 10.0% cases among 5 hands. Wasting was found in 2.0% cases in 1 hand (Table 4).

Table 4: Different Symptoms among the Study Population

Symptoms	Frequency	Percentage
Tingling		63.0
Numbness		22.0
Pain		41.0
Weakness		10.0
Wasting		2.0

Pain Analysis

At the beginning of the study (week 0) VAS was recorded for booth splinted and Non-splinted group of the patients with carpal Tunnel Syndrome selected in a random way. At the beginning of the observation of the observation the mean VAS was 6.54 in Splinted and 7.00 in Non-splinted group. The t test showed there was non-significant difference in the means of both groups (P=3.81). However, after 4 weeks of treatment with medicines and with or without a 'Splint', the mean VAS was decreased in both the two groups. But the decrease was significantly different in group with splints. The above table VAS was 2.48 in splinted group and Non-splinted group 4.09 (p=.000) at the end of the study. Thus and inference can be drawn that the splints helps in decreasing symptoms of carpal Tunnel Syndromes if treated in addiction with drugs and ergonomics (Table 5).

Table 5: Outcomes Variables among the Study Population

Outcome Scales	Week 0	Week 0	P value	Week 6	Week 6	P value
	Splinted N=26	Non-Splinted n=23		Splinted n=26	Non-Splinted N=23	
VAS	6.54	7.00	0.381	2.48	4.09	0.0001
LSSS	18.19	17.39	0.351	11.62	13.48	0.002

Discussion

This is a quasi-experimental study on carpal tunnel syndrome by splinting wrist for patients with symptoms. It showed a 6 week trials of splinting for patients with symptoms of CTS .There was gradual improvement of symptoms in second, fourth and sixth weeks follow up. Parameters to measure outcomes of the trial (VAS scale and Levine symptoms severity scale) showed a trend towards improvement. Both the treatment and controlled group had improvement symptoms over time but the rate of improvement was greater among splinted groups. Improvement was significant and controlling for other covariant such as treatment of primary cause and initial presentation of symptoms intensity and duration (Ganong 1989).

There were 51 hand in 34 patients. Among them 26 were in the splinted group 23 were in non-splinted group. Both groups were treated by drugs, exercise, education about ADL and ergonomics. Despite wide use of splinting as a primary treatment CTS, there has not been and RCT of splinting versus other conservative management of CTS. There has been an RCT of splinting plus steroid injection versus conservative

management that showed that the combinations of interventions was beneficial among patients with CTS[2]. Another RCT Europe compared and carpal tunnel release surgery for managements of CTS[3]. Study showed surgery was more effective invention with 85.0% having better outcome with surgery and 65.0% with splinting.

The splinted group also had relief of symptoms at the elbow and forearm regions. This may simply reflect pain from median nerve entrapment, it is possible that the splinting was also beneficial for other musculoskeletal disorders, including tendinitis, localized muscle fatigue and an arthritis. The finding that controls with more severe median nerve impairment did not have improvement of their symptoms in elbow and forearm symptoms suggests that these symptoms are more likely related to carpal tunnel symptoms than to other musculoskeletal disorders (Kimura 1979).

Stressful psychological variable have been strongly related to back pain, but less commonly related to musculoskeletal disorder of upper limb. Stress factor may be a factor in relative lack of improvement symptoms (Franzblau et al., 1994). Age distribution of both group was well matched. Mean age of both groups was 41 years. The mean age of splinted group was 41 years and that non-splinted group was 40 years. There was statistically significant difference between two groups. In his study highest % of patient between 41-50 age group, which is similar to study done by Pruitt, who found most of their patients were between 40 to 60 years.

Regarding sex distribution, both splinted and non-splinted groups matched well with no significant statistical difference. In this study female patients were 88 and male were 12%.Male to female ratio 1:7.So this study shows female prevalence of female patient is higher in our country. Male to female ratio in Europe is 1:4, which is lower than our study. This may be due to the fact that females are more involved in household activities.

In this study tingling is the most common presenting symptoms, which is about 63% (33 hands).Other common symptoms are pain 41.0% (20 hands),numbness 22.0% (11 hands),weakness 10.0% (5 hands),wasting 2.0% (1 hand). This is study consistent with studies done by de Campos[1] who studies 215 patients with suspected CTS.

Socio-economically patients were grouped into 3 groups .Upper class are those ,whose monthly family income above 50000 taka, middle class are those whose monthly income between 5000-50000 taka and lower class are those whose monthly family income below 5000 taka. This study shows highest patient among middle class and lowest among upper income group. This is a Quasi-experimental study with a significant outcome management of CTS. Though, the study had several limitations. The sample size was small and this limits the power of study to determine statistical significance of the secondary outcome measures to stratified analysis. Larger study is necessary to confirm these finding and to show standard. Effect of splint on symptomatic relief in case of carpel tunnel syndrome. Thus and inference can be drawn that the splints helps in decreasing symptoms of carpal Tunnel Syndromes if treated in addiction with drugs and ergonomics

Conclusion

In conclusion wrist splint can be a powerful conservative management option for management of carpal tunnel syndrome.

References

Franzblau A, Werner RA, Alberts, Grant CL, Olinski R, Johnson E. Workplace surveillance for carpal tunnel syndrome using hand diagrams. Journal of Occupational Rehab 1994:4:185-9

Ganong WF. Excitable tissue: Nerve in review of medical Physiology. Twelve edition. California: Lange medical publications:1985;2:pp 32-43

Kimura J. The carpal tunnel: Localization of conduction Abnormalities within distal segments of the median nerve 1979;102:619-35

Werner RA, Franzblou A, Gell N. Randomized controlled trial of Nocturnal splinting of active workers with symptoms of carpal tunnel Syndrome. Arch Physal Med Rehab 2005,86:1-7