



A Study on Efficacy of Physical Rehabilitation Intervention Programme on Carpal Tunnel Syndrome in Computer Workers

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ABSTRACT

Background: Carpal tunnel syndrome (CTS) is a compression neuropathy of the median nerve as it passes through the carpal tunnel. In recent years, with the expanding use of computers, it has been a matter of concern if computer use could be a risk factor for the development of Carpal tunnel syndrome. bjective: To find prevalence of self-reported carpal tunnel syndrome and to prove the effectiveness of Physical rehabilitation Intervention programme on pain and disability in carpal tunnel syndrome among Computer Professionals. Design: Experimental study. Participants: Participants were recruited from Software Companies (n=38, age range= 20-50 years, mean age= 35 years, male or female) and asked to fill questionnaire form about musculoskeletal symptoms and intensity or severity of pain experienced. Measurements: Visual analog scale, CTSQ- carpal tunnel syndrome questionnaire. Results: The data obtained was tabulated and statistically analyzed. Due to nature of outcome measures i.e. pain and disability, pre and post intervention, parametric statistical tests, dependent t sample test and un paired t test were used. The two-tailed P value is less than 0.0001 by conventional criteria, this difference is considered to be extremely statistically significant of both variables. Conclusion: This study was concluded that the Physical rehabilitation intervention programme by improving quality of life as noted through decrease in reports of pain and disability of carpal tunnel syndrome in computer workers.

Keywords: Physical Rehabilitation, carpal tunnel syndrome, computer workers

INTRODUCTION:

Computers have become a vital tool to keep pace with time and progress. The world health organization (1998) has estimated that 150 million computers are use in world wide. Consequently, the proliferation of computers in the modern office setting has generated concern related to potential health hazards associated with their use. There have been numerous operator complaints of a wide range of symptoms with work-related musculoskeletal disorders (WMSDs) being among them (1). WMSDs account for approximately one-third of all lost workday illnesses. WMSDs of the wrist and hand are associated with the longest absences from work and are therefore, associated with greater loss of productivity and wages than those of any other anatomical region [2-3] The risk factors for the occurrence of WMSDs of wrist and hand in computer users are "multi factorial" in origin including improper interaction of computer users with the tool, workstation and task performed (6). Key board typing force is another risk factor. To ensure optimal performance, it is necessary that the work places and work station provide effective support to prevent discomfort or injury. Although the use of computers in India is on the rise with the fast growing software industry, data on WMSDs are limited. Therefore, we undertook to determine the prevalence of WMSDs of the wrist and hand among computer users in a local setting in India. Carpal Tunnel Syndrome (CTS) as the name suggests is the impairment of function of the median nerve within the carpal tunnel secondary to its compression resulting in mechanical compression and local ischemia [1]. Contrary to the popular belief that CTS is a disorder of information technology era resulting from prolonged use of computer keyboards for hour's together, evidence of people suffering from CTS can be found in medical literature almost from the beginning of 20 century [2]. Switching to a much more ergonomic mouse, such as a roller mouse, vertical mouse or joystick, or switching from using a mouse to a stylus pen with graphic tablet may provide relief, but in chronic RSI they may result only in moving the problem to another area. Using a graphic tablet for general

pointing, clicking, and dragging (i.e. not drawing) may take some time to get used to as well. Switching to a track pad or pointing stick, which requires no gripping or tensing of the muscles in the arms may help as well. Inertial mice (which do not require a surface to operate) might offer an alternative where the user's arm is in a less stressful thumb up position rather than rotated to thumb inward when holding a normal mouse. Also, since they do not need a surface to operate ("air mice" function by small, forceless, wrist rotations), the wrist and arm can be supported by the desktop. It is clear from the literature available, that though carpal tunnel is a common complaint among computer professionals and the computer technology is advancing at a faster pace, little is done in preventing the ailments that are associated with its use. There is lack of evidence based studies in this area. Therefore, due to an almost complete lack of empirical evidence supporting the clinical use of physical rehabilitation programme for carpal tunnel syndrome, this study is being conducted.

3 OBJECTIVES:

To find prevalence of self-reported carpal tunnel syndrome and to prove the effectiveness of Physical rehabilitation Intervention programme on pain and disability in carpal tunnel syndrome among Computer Professionals.

Methodology: A convenience sample of subjects was solicited from various Software Companies. Inclusion criteria included any person (20- 50 years) using Computer for at least 4-5 hours per day, complaining of pain and numbness in the flexor aspect of the wrist joint around the capal tunnel region in body for the last three months. Exclusion criteria included pregnant women, persons with rheumatoid arthritis, ankylosing spondylitis, tumors, vertebro basilar insufficiency symptoms, fracture or dislocation, recent undergone surgery or any acute inflammatory problem.

Materials: Visual analog scale, CTSQ- carpal tunnel syndrome questionnaire.

PROCEDURE: Participants were recruited from Software Companies (n=38, age range= 20-50 years, mean age= 35 years, male or female) and asked to fill questionnaire form about musculoskeletal symptoms and intensity or severity of pain experienced. Subjects were then allocated into two groups,

Group A, where subjects were taught carefully self relaxation exercises, and advised advice on Ergonomic Advice during work hours.

Subjects in Group B were just asked to take hot packs for 15-20 minutes at night and postural advice given.

PHYSICAL REHABILITATION INTERVENTION PROGRAMME:

This is including Relaxation exercises and ergonomic advice. These are all components applied to carpal tunnel syndrome affecting the computer professionals.

RELAXATION EXERCISES:

1. Mitchell methods of relaxation techniques
2. Wrist and thumb free exercises

4 ERGONOMIC ADVICE:

COMPUTER KEY BOARD USE:

1. Slanted orientation of keys with wrist wide support section at the base of the key board.
2. Avoid striking keys with excessive force
3. Do not place wrist in an extended and flexed position
4. Keep wrist straight
5. Consider using a keyboard wrist rest pad.
6. Take frequent breaks
7. Use macros and keyboard short cuts to reduce keying.

COMPUTER MOUSE USE:

1. Use gel mouse palm pad Switch from using a mouse to a track ball or touch pad.

Outcome Measures- Pain and Range of motion were recorded on day 0, day 16 and day 31 whereas disability scores were recorded on day 0 and day 31.

Results:

A total of 38 subjects were identified as potential participants for this study and were allocated to the experimental and treatment groups. The mean age of the respondents was 40.8 years, with 53% females and 47% males. The respondents had a mean of 9 years of experience with an average of 7 hours spent on computer per day.

The data obtained was tabulated and statistically analyzed using SPSS 14.0 package. Due to nature of outcome measures i.e. pain and CTSQ, parametric statistical tests, dependent t sample test and unpaired t test were used.

Pain was measured by visual analogue scale and disability was measured by Carpal tunnel syndrome questionnaire (CTSQ).

Subjects showed marked reduction in pain intensity when compared to baseline value. The improvement is almost where as disability scores were recorded on day 0 and day 31.

Table. 1 Pre score analysis of pain and disability for Group A and B

S. NO	Statistical measurement	GROUP A		GROUP B	
		PAIN	DISABILITY	PAIN	DISABILITY
1.	Mean	6.18	29.39	6.39	25.55
2.	Standard deviation	0.72	2.83	0.63	3.85
3.	Variance(Standard deviation):	0.53	8.02	0.40	14.84
4.	Population Standard deviation:	0.72	2.79	0.62	3.80
5.	Variance(Population Standard deviation):	0.51	7.8	0.39	14.45

Table.2 Post score analysis of pain and disability for both groups:

S. NO	measurement	GROUP A		GROUP B	
		PAIN	DISABILITY	PAIN	DISABILITY
1.	Mean	0.63	2.65	3.39	7.13
2.	Standard deviation	0.67	1.56	0.88	1.39
3.	Variance(Standard deviation):	0.45	2.44	0.78	1.95
4.	Population Standard deviation:	0.66	1.54	0.87	1.37
5.	Variance(Population Standard deviation):	0.44	2.38	0.76	1.90

Fig.1 Line Diagram showing comparison between groups for pre-scores.

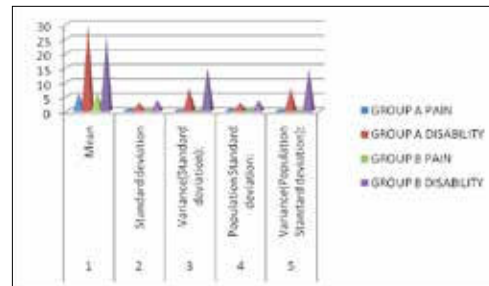


Fig.2 Graph showing comparison between groups post scores.

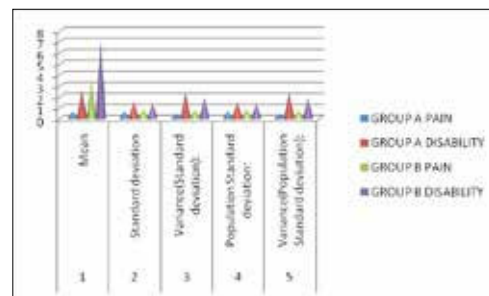


Table.3 Unpaired "t test" values of pain and disability.

S. NO	VARIABLES	t value	difference	standard error of difference	results
1.	PAIN	31.9122	74	0.181	SIGNIFICANT
2.	DISABILITY	13.1473	74	0.340	SIGNIFICANT

Independent t sample test was used for between group analyses while paired t test was used for within group analysis for all the outcome measures. The two-tailed P value is less than 0.0001 By conventional criteria, this difference is considered to be extremely statistically significant of both variables. 95% confidence interval of this difference.

Discussion:

The proposed study suggests that the relaxation exercises and ergonomic advice can be incorporated as a treatment tool for Computer professionals during their work hours, along with the application of hot packs as well as postural advice. It resulted in an overall improvement in pain, functional outcome and disability as tested. The significant improvement was seen clinically for all the outcome measures, as reported by subjects receiving self relaxation exercises. Early recovery from pain with lesser number of sessions of self relaxation exercises and improvement in range of motion was reported by the subjects in experimental group. It is clearly seen from the graphs that consistent and significant improvement had occurred during the treatment phase as well as follow up phase of the intervention.

Suggestions and Limitations:

- Identify the problem and explanation of preventive measures of carpal tunnel syndrome.

- Hands on therapy intervention applied. No medicines are in taken.
- Use of computer and prevention of carpal tunnel syndrome and avoidance of surgical intervention.
- Ergonomic advice with prevention of inflammation, pain, numbness and disability of wrist and hand in computer workers.
- To improve IT Health and prevention of musculoskeletal disorders and damaged tissues.
- Physical rehabilitation is very useful for computer workers with improve relaxation stress, pain and no side effects.

Due to relatively small sample size, it was not possible to infer patient characteristics corresponding with treatment outcome. Future research is essential for the subjects with chronic Carpal tunnel syndrome as general population along with large sample size and to further optimize clinical practice. Also, further studies may require more regular assessment

during the intervention period to determine the timeframe of improvement and to investigate the outlining of elements of the technique and the rationale for adapting the specific intervention according to the repeated assessment findings.

Conclusion:

This study was found that group receiving relaxation exercises and ergonomic advice showed better carry over effect during treatment phase and more during follow up phase as compared to group receiving conventional management alone. Thus, the findings of this study suggest that ergonomic intervention can be incorporated for pain and disability is more effective than conventional management alone. It is hoped to determine proper improvement ways to eliminate these key risk factors and then to prevent from carpal tunnel syndrome. Thus this study was to evaluate and application of physical rehabilitation programme can cure the problems of carpal tunnel syndrome in computer professionals.

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