

The effect of 8 weeks of Kinesio Taping and sport program on grip endurance of manufacturing industrial female assembly workers

Farzane Fadaei¹, Zahra Ordudari^{1*}, Fereshteh Karamiani³, Ehsanollah Habibi², Akbar Hasanzadeh⁴

1. MSc, Student Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.

2. Department of Occupational Health Engineering, Isfahan University of Medical Sciences, Iran.

3. MSc Student, School of rehabilitation, Department of physiotherapy, Isfahan University of Medical Sciences, Iran

4. Department of Statistics and Epidemiology, Isfahan University of Medical Sciences, Iran

Abstract

Introduction. The effect of exercise program on the prevention of upper extremities musculoskeletal disorders has attracted the attention of researchers. On the other hand, in assembly workers, the risk of these disorders increases because the part of the body is used successively and without rest. The current study investigates the effect of 8 weeks of Kinesio Taping and sport program on grip endurance in female assembly workers of an electrical piece industrial manufacturer.

Materials and Methods. The current study was used a descriptive-analytic, cross-sectional method among 40 female assembly workers. Participants are exercised and used Kinesio taping for two times per week at eight weeks. The endurance of the grip was determined before and after the intervention by a dynamometer and the maximum time (in seconds) that one was able to continue one third of the maximum voluntary contraction. The DASH questionnaire was used to assess upper limb extremities' disability. Data were analyzed using SPSS Ver.20 and the P value was considered smaller than 0.05.

Results. In the present study, the mean of right and left hand grip endurance in kinesio type and exercise group before intervention were obtained 10.55 and 9.51, whereas, related results after intervention were obtained 20.55 and 16.18, respectively. Also the score of upper limb disability in kinesio type and exercise group before intervention were obtained 10.55 and 9.51 and after intervention obtained 20.55 and 16.18, respectively (P < 0.05).

Conclusion. According to the results, sport exercise and kinesio taping, lead to the increase in the grip endurance time and decrease in the upper limb disability.

Keywords. Grip endurance, Assembly worker, Sport exercise, Kinesio Tape, DASH

*Corresponding Author: Zahra Ordudari

Email Address: zordudari@yahoo.com

1. Introduction

Musculoskeletal disorders are the main cause of disabilities and loss of productivity(1). Exercise and Kinesio therapy as an ergonomic intervention program in the prevention of upper limb musculoskeletal disorders has attracted the attention of many researchers(3)(2).

Musculoskeletal disorders of the electrical equipment production companies workers can be easily traced with the initial observation, as well as the nature of the production process during their routine work(4). Therefore, this study was conducted to examine the effect of 8 weeks of Kinesio Taping and sport program on grip endurance of manufacturing industrial female assembly workers.

2. Experimental

This research is a clinical trial study in the assembly unit of an electrical equipment manufacturing industry with 40 women workers. In this study, the DASH questionnaire was used to measure the Disability of the upper limb before and after intervention(5)(6). To measure grip endurance of hand, the American Society of Hand Therapists protocol and dynamometer was used. Participant's grip endurance was specified through determining the maximum time (in seconds) that he could continue applying one-third of the maximum

voluntary contraction(7). A standardized intervention program including stretching and strengthening exercises based on wrist-related injuries and carpal tunnel syndrome was trained and implemented(8). The intervention was performed for eight consecutive weeks, twice a week. At the end of the exercises, and after putting the kinesio tape on the hands of the first intervention group, the participants returned to their workplace to continue working. An example of exercise and kinesio Taping using method is shown in Figure 1.

3. Results and Discussion

The present study was conducted on 40 female assemblers working in the electrical industry. The mean and standard deviation of the quantitative data was indicated in Table 1. Descriptive statistics of the qualitative variables of the subjects were also presented in Table 2.

Paired t-test showed that there was a significant difference between mean left and right hand stability time and upper extremity disability after and before kinesio typing and exercise and exercise alone; had a positive. On the other hand, kinesio therapy and exercise have reduced upper extremity disability. It should be noted that these are not observed in the control group.

In this study, as can be seen in Table 4, Pearson's correlation coefficient showed that

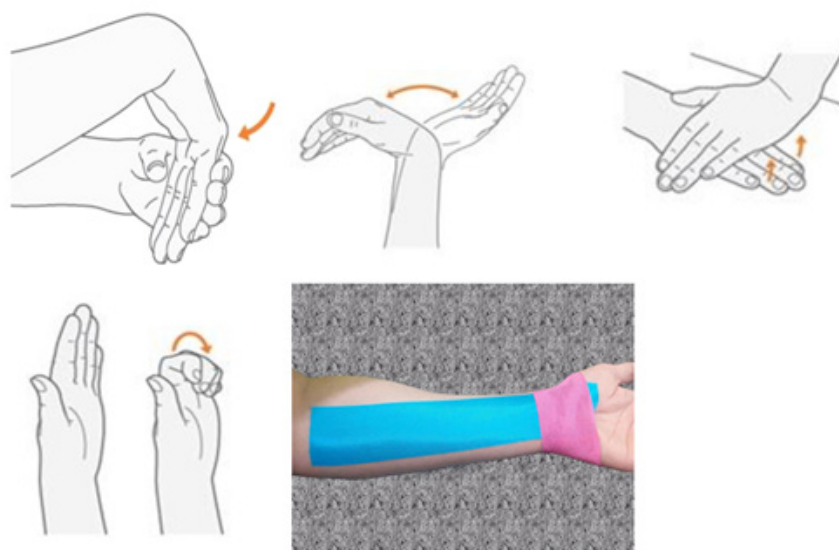


Fig. 1. An example of exercise and kinesio taping using method.

Table 1. Mean and standard deviation of quantitative data in the subjects.

Variable	Mean \pm SD	Maximum data	Minimum data
Age (years)	67.33 \pm 88.6	50	23
Weight (kg)	65.05 \pm 8.64	88	48
Height (cm)	162.37 \pm 6.72	178	147
Experience (years)	4.03 \pm 3.77	18	1
BMI (kg / m ²)	24.74 \pm 3.40	85.32	50.15
Right hand grip	27.11 \pm 6.13	60.42	11
Left hand grip	24.07 \pm 5.31	38	33.10

Table 2. Descriptive statistics of qualitative variables of the subjects.

Qualitative variables	Frequency (%)	
Marital status	Single	5.22
	Married	5.77
Sports program	YES	20
	NO	80
The dominant hand	Right	5.82
	Left	5.17
History of hand pain	Right	35
	Left	30
	NO	35
Upper extremity disability score	without problem	5.7
	Mild problem	55
	Moderate problem	5.22
	Severe problem	5.12
	Powerless	5.2

Table 3. The mean of left and right hand stability time and upper extremity disability score after and before intervention in the three study groups.

Variable	Number of people in each group	Groups	Mean \pm SD	r	P-value	
Use of kineso typing and exercise	11	Right hand grip endurance time (s)	Before intervention	10.55 \pm 5.04	0.655	0.029
			After the intervention	20.55 \pm 11.14		
		Left Hand Grip endurance Time (s)	Before intervention	9.51 \pm 9.45	0.819	0.002
			After the intervention	16.18 \pm 10.59		
		Upper extremity disability score (%)	Before intervention	38.71 \pm 27.19	0.946	\leq 0.001
			After the intervention	25.07 \pm 19.49		
Use of exercise	16	Right hand grip endurance time (s)	Before intervention	18.06 \pm 12.33	0.507	0.045
			After the intervention	32.06 \pm 18.76		
		Left Hand Grip endurance Time (s)	Before intervention	20.94 \pm 12.58	0.619	0.011
			After the intervention	40.19 \pm 30.48		
		Upper extremity disability score (%)	Before intervention	20.36 \pm 18.83	0.951	\leq 0.001
			After the intervention	10.96 \pm 11.73		
control group	13	Right hand grip endurance time (s)	Before intervention	20.69 \pm 9.69	0.384	0.195
			After the intervention	17.85 \pm 7.23		
		Left Hand Grip endurance Time (s)	Before intervention	21.92 \pm 14.30	0.812	0.241
			After the intervention	19.38 \pm 15.89		
		Upper extremity disability score (%)	Before intervention	12.14 \pm 14.50	0.987	0.097
			After the intervention	13.63 \pm 16.16		

Table 4. The relationship among demographic variables with right hand, left hand stability and upper extremity disability score

Variable		Upper extremity disability score	Left hand grip endurance	endurance of right hand grip
Age	r	0.546	0.006	-0.82
	P- value	≤0.001	0.972	0.614
Weight	r	0.103	-0.0030	-0.72
	P- value	0.528	0.854	0.659
Height	r	0.235	-0.046	-0.012
	P- value	0.144	0.776	0.942
work experience	r	-0.1.9	0.039	0.038
	P -value	0.503	0.052	0.816
BMI	r	0.234	-0.0014	-0.080
	P- value	0.146	0.932	0.625

among demographic variables, only age have had a positive significant relationship with upper extremity disability score, and no significant relationship was found among other variables.

4. Conclusions

According to the results, it seems that doing at least 2 or 3 sessions per week during working hours will increase both endurance time of the hands and decrease the fit of upper assemblies. Therefore, it is recommended that the exercise program be included in the personnel work program to improve performance. It is also recommended that further studies be conducted to investigate the use of kinesio types in different organs and their effects on improving the pain and performance of workers and employees as well as men.

5. References

- Baldwin ML. Reducing the costs of work-related musculoskeletal disorders: targeting strategies to chronic disability cases. *Journal of Electromyography and Kinesiology*. 2004;14(1):33-41.
- Chen Y. *The Technique of Kinesiotaping*. The Community Health and Sports Association of the Republic of China, Taipei, Taiwan. 1995.
- Pouyakian M, Saremi M, Etemad K, Shafagh H. Investigation of Ergonomic Issues of Pharmacies: Conducted Qualitative study. *Health and Safety at Work*. 2018;8(3):265-82.
- Tompkins JA. *No Boundaries: Break Through to Supply Chain Excellence*: Tompkins Press; 2003.
- Hudak PL, Amadio PC, Bombardier C, Beaton D, Cole D, Davis A, et al. Development of an upper extremity outcome measure: the DASH (disabilities of the arm, shoulder, and hand). *American journal of industrial medicine*. 1996;29(6):602-8.
- Mousavi SJ, Parnianpour M, Abedi M, Askary-Ashtiani A, Karimi A, Khorsandi A, et al. Cultural adaptation and validation of the Persian version of the Disabilities of the Arm, Shoulder and Hand (DASH) outcome measure. *Clinical rehabilitation*. 2008;22(8):749-57.
- Mehta RK, Cavuoto LA. The effects of obesity, age, and relative workload levels on handgrip endurance. *Applied ergonomics*. 2015;46:91-5.
- Akalin E, El Ö, Peker Ö, Senocak Ö, Tamci S, Gülbahar S, et al. Treatment of carpal tunnel syndrome with nerve and tendon gliding exercises. *American journal of physical medicine & rehabilitation*. 2002;81(2):108-13.