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

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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. 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.

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

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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 kineso 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

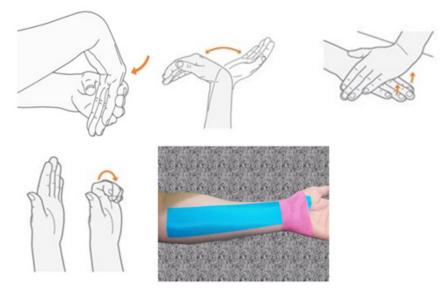


Fig. 1. An example of exercise and kinesio taping using method.

Zahra Ordudari et al

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

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

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.

Number of people in each group	Groups		Mean ±SD	r	P -value
11	Right hand grip	Before intervention	10.55±5.04	0.655	0.029
typing and exercise	endurance time (s)	After the intervention	20.55±11.14	-	
	Left Hand Grip endurance Time (s)	Before intervention	9.51±9.45	0.819	0.002
		After the intervention	16.18±10.59	-	
	Upper extremity disability score (%)	Before intervention	38.71±27.19	0.946	≤0.001
		After the intervention	25.07±19.49	-	
16	Right hand grip	Before intervention	18.06±12.33	0.507	0.045
exercise	endurance time (s)	After the intervention	32.06±18.76	-	
	Left Hand Grip	Before intervention	20.94±12.58	0.619	0.011
	endurance Time (s)	After the intervention	40.19±30.48		
	Upper extremity	Before intervention	20.36±18.83	0.951	≤0.001
	disability score (%)	After the intervention	10.96±11.73	-	
control group 13	Right hand grip endurance time (s)	Before intervention	20.69±9.69	0.384	0.195
		After the intervention	17.85 ± 7.23	-	
	Left Hand Grip	Before intervention	21.92±14.30	0.812	0.241
	endurance Time (s)	After the intervention	19.38±15.89	-	
	Upper extremity	Before intervention	12.14±14.50	0.987	0.097
	disability score (%)	After the intervention	13.63±16.16	-	
	people in each group 11	people in each groupRight hand grip endurance time (s)11Right hand grip endurance time (s)Left Hand Grip endurance Time (s)Upper extremity disability score (%)16Right hand grip endurance time (s)16Left Hand Grip endurance Time (s)16Right hand grip endurance time (s)13Right hand grip endurance time (s)13Left Hand Grip endurance time (s)14Left Hand Grip endurance time (s)15Upper extremity disability score (%)16Left Hand Grip endurance time (s)17Upper extremity disability score (%)18Night hand grip endurance time (s)19Upper extremity disability score (s)13Night hand grip endurance time (s)14Upper extremity endurance time (s)	people in each groupRight hand grip endurance time (s)Before intervention11Right hand grip endurance time (s)Before interventionLeft Hand Grip endurance Time (s)Before interventionUpper extremity disability score (%)Before intervention16Right hand grip endurance time (s)Before intervention16Right hand grip endurance time (s)Before intervention16Right hand grip endurance time (s)Before intervention17Left Hand Grip endurance time (s)Before intervention18Right hand grip endurance time (s)Before intervention19Right hand grip endurance time (s)Before intervention13Right hand grip endurance time (s)Before intervention13Right hand grip endurance time (s)Before intervention14Left Hand Grip endurance time (s)Before intervention15Left Hand Grip endurance time (s)Before intervention16Left Hand Grip endurance time (s)Before intervention17Dipper extremity endurance time (s)Before intervention18Right hand grip endurance time (s)Before intervention19Left Hand Grip endurance time (s)Before intervention11Left Hand Grip endurance Time (s)Before intervention13Left Hand Grip endurance Time (s)Before intervention14Left Hand Grip endurance Time (s)Before intervention15Left Hand Grip endurance T	people in each groupRight hand grip endurance time (s)Before intervention10.55±5.0411Right hand grip endurance time (s)Before intervention20.55±11.14Left Hand Grip endurance Time (s)Before intervention9.51±9.45Upper extremity disability score (%)Before intervention16.18±10.5916Right hand grip endurance time (s)Before intervention25.07±19.4916Right hand grip endurance time (s)Before intervention25.07±19.4916Right hand grip endurance time (s)Before intervention32.06±18.7617Left Hand Grip endurance Time (s)Before intervention20.94±12.5813Right hand grip endurance time (s)Before intervention20.36±18.8313Right hand grip endurance time (s)Before intervention20.69±9.6913Right hand grip endurance time (s)Before intervention21.92±14.3014Hand Grip endurance time (s)Before intervention21.92±14.3015Dipper extremity endurance time (s)Before intervention21.92±14.3014Hand Grip endurance time (s)Before intervention21.92±14.3015Dipper extremity endurance time (s)Before intervention21.92±14.3016After the intervention12.14±14.50	people in each groupRight hand grip endurance time (s)Before intervention 10.55 ± 5.04 20.55 ± 11.14 0.655 0.819 11Right hand grip endurance Time (s)Before intervention 9.51 ± 9.45 $After the intervention0.8190.819Upper extremitydisability score (%)Before intervention38.71\pm27.19After the intervention0.9460.81916Right hand gripendurance time (s)Before intervention18.06\pm12.330.5070.50716Right hand gripendurance time (s)Before intervention18.06\pm12.330.5070.61916Right hand gripendurance time (s)Before intervention20.94\pm12.580.6190.61917Differ the intervention20.36\pm18.830.9510.95118Right hand gripendurance time (s)Before intervention20.36\pm18.830.9510.95113Right hand gripendurance time (s)Before intervention21.92\pm14.300.8120.812After the intervention21.92\pm14.300.81213Right hand gripendurance time (s)Before intervention21.92\pm14.300.8120.812After the intervention21.92\pm14.300.981214Upper extremityendurance time (s)Before intervention21.92\pm14.300.8120.987$

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

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

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.

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