

The Effect of Particular Joint Exercise on Carpal Tunnel Syndrome and Cubital Tunnel Syndrome Disease



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Abstract— Ergonomic positions commonly performed by dental and oral health service activities are repetitive movements, unnatural hand positions, static work positions, etc. Hand stretching exercises are proven to reduce tingling and weakness of hand diseases such as Carpal Tunnel Syndrome and Cubital Tunnel Syndrome. The effect of outreach of hand stretching exercise on the level of symptoms of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome in students of the Polytechnic of Health Sciences Jakarta I. BCTQ and Katz Hand Diagram were used to determine the level of symptoms of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome as pre-test and post-test. 14 participants had taken the questionnaire and found 11 participants showing improvement and 3 participants showing decreasing symptom levels. Stretching exercises and activity modifications had significant results in reducing the number of symptoms of participants who followed the counseling recommendations, Include the objective assessments more accurately determine symptom levels and disease types, apply more structured research patterns to prevent participants from dropping out from the procedure. The socialization will be successful if the participants follow the recommendations given. The point of any indicative strategy is speed and a decrease in turnaround time. This turns into an urgent need, especially for unbearable basic infections.

Keywords: stretching exercise Carpal Tunnel Syndrome

1. Introduction

Washington University conducted a study related to Carpal tunnel syndrome (CTS) and Cubital tunnel syndrome (CuTS), the study was conducted on 1001 adults in the age range 21-75 years found 191 people had symptoms with 6.8% positive for having Carpal tunnel syndrome and 5.9% positive with Cubital tunnel syndrome [1].

In Indonesia, a study has been conducted with fishermen on the coast of Manado in Maasing, it was found that from a total of 45 subjects there were 24 positive people experiencing symptoms, with a distribution of 12 people positive for CTS, 3 people positive for CuTS and 9 others positive for both [2]. Other studies have shown an association between repetitive motion and strenuous hand activity, non-neutral hand posture and hand vibration [3]. This can be interpreted that the activities / jobs that are at risk for CTS and CuTS are those that involve full hand activities.

The potential hazards of ergonomics performed by dentists are repetitive movements, static work positions, and some awkward positions. This description shows that dental and oral health practitioners have risk factors for developing Carpal tunnel syndrome and Cubital tunnel syndrome [4]. Therefore it is important to do prevention, prevention can be in the form of stretching the muscles. Stretching exercises with joint space exercise in the wrist, hand and arm muscles is one way to prevent and treat CTS conservatively [5]. The continuous stretching exercises can repair the median nerve trapped in the carpal tunnel at the wrist⁵, thereby reducing symptoms or pain. Hand stretching exercises have also been shown to reduce tingling and weakness in the hands for sufferers of hand

complaints in women garment workers [6]. Therefore, the researcher wanted to analyze the effect of counseling on hand joint space exercise on the level of symptoms of Carpal tunnel syndrome and Cubital tunnel syndrome in Dental Health students of the Polytechnic of Health Sciences Jakarta I.

Carpal tunnel syndrome (CTS) occurs due to pressure on the median nerve as it passes through the carpal tunnel at the wrist. Several predispositions are known, such as trauma, infection, endocrine disorders, etc [7]. Cubital Tunnel Syndrome is a ulnar nerve neuropathy that causes numbness and pain in the medial arm, including the medial half of the ring finger and little finger, usually caused by compression or irritation of the ulnar nerve [8].

Bob Anderson (2000) and the American Physical Therapy Association (1996) describe the basic movements of Hand, Wrist, and Arm Stretches as follows: 1). The palms, back and wrists are in a perfectly straight or anatomical position, then the fingers grip. 2). Fold the fingers inward to 90° angle then do the gripping position. Repeat this movement 4 times. 3). Lace your hands and lock the position with your fingers then turn your hands and wrists clockwise. The main focus is the movement of the wrist joint. 4). The position of the hands remains as movement no. 3, but turn the wrist counterclockwise. 5). Straighten your hands and then open your fingers as wide as possible until you feel the pressure on your fingers. 6). Bend the finger joints like a grip or a tiger's hooves and hold that position for 10 seconds then relax again. 7). Straighten your arms right in front of your position, then bend your wrists with your fingers pointing upwards, hold that position for 10-12 seconds and do it twice. This movement aims to train the flexibility of the posterior forearm muscles. 8). Straighten your arms right in front of your position, then bend your wrists with your fingers pointing downwards, hold that position for 10-12 seconds and do it twice. This movement aims to train the flexibility of the anterior forearm muscles. 9). Hold and rotate each finger clockwise then counterclockwise with the thumb and forefinger of the opposite hand, do this 5 times. 9). Pull each finger until you feel the pressure on the finger with the thumb and forefinger of the opposite hand, maintaining the motion for 2-3 seconds. 10). Shake your upper and lower arms and hands at your sides in a relaxed and straight position. Do this movement for 10-12 seconds. 11). Both arms in a straight position in front of the body, then bend the right and left wrists outwards until you feel the pressure on the wrist joints. Hold this movement position for 5-10 seconds. 12). Place and clench both palms in front of the body's diaphragm until you feel pressure on the wrists and the elbows form a 90 angle to the body. Hold for 5-10 seconds. 13). The position of the palms and arms is the same as the previous movement, then rotate the clenched palms downwards. Hold this position for 5-10 seconds. 14). Both palms return upwards or cranially then bend to the right and left to form a 45° to the forearm. Hold this position for 5– 8 seconds.

2. Method

A quantitative descriptive study of 39 students of the Dental Health Study Program at the Health Polytechnic of the Ministry of Health, Jakarta I in 2019 from January 2020 - April 2020. Data collection used the Boston Carpal Tunnel Questionnaire and Katz Hand Diagram to determine whether individuals have symptoms of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome as well as depiction in diagrams of the symptoms felt by participants, and counseling about Carpal Tunnel Syndrome and Cubital Tunnel Syndrome using media in the form of pamphlets.

Participants were given a questionnaire as a pre-test then continued with counseling about CTS and CuTS, as well as Hand Joint Exercises. Participants were given a gap of two months to see the

progress of the level of symptoms and then the same questionnaire was given again as a post-test, then the results were analyzed with the results of the pre-test given before the counseling.

3. Results

The results of the study were obtained from 14 participants who were level III (three) students majoring in Dental Health Poltekkes Kemenkes Jakarta I, participants had gone through research procedures starting from January to April. Gymnastics activities in the joint space of the hands are divided into two major categories, namely before phenylethane during the pre-test, those who have never done it because they do not know and already know, namely after counseling during the post-test.

Based on table 1, it was found that 6 participants experienced symptoms of carpal tunnel syndrome, 2 people experienced cubital tunnel syndrome symptoms, and 6 people experienced both symptoms.

Table 1. Characteristics of Participants' Disease Type

Disease Type	Number of Participants
Carpal Tunnel	6
Cubital Tunnel	2
Both	6
Total	14

The distribution of CTS and CuTS symptom levels in participants prior to counseling is described as follows.

Table 2. Frequency of Participants Symptom Level Before Counseling

Symptom Level	Frequency	Percentage	mean
No Symptoms	5	35.7%	
Mild	8	57.1%	19.14
Medium	1	7.1%	
Total	14	100%	

Table 2 shows that there are 5 participants who have no symptoms, 8 participants have mild symptoms, and 1 person has moderate symptoms. In table 3 after counseling there are changes in the level of symptoms where the number of participants who have no symptoms is 9 people, with mild symptoms as many as 4 people, and 1 person has moderate symptoms.

Table 3. Frequency of Participants' Symptom Levels After

Symptom Level	Frequency	Percentage	mean
No Symptoms	9	64.3%	
Mild	4	28.6%	16.57
Medium	1	7.1%	
Total	14	100%	

The relationship between gymnastics activities after counseling and the level of symptoms of CTS and CuTS after counseling is illustrated in diagram 1. It can be seen that there are 9 participants who do not have symptoms as many as 8 people do not do exercise and 1 person does exercise once a week; 5 participants had symptom levels in the mild to moderate range as many as 2 people did not do exercise, 2 others did exercise once a week, and one person did exercise only when it hurt.

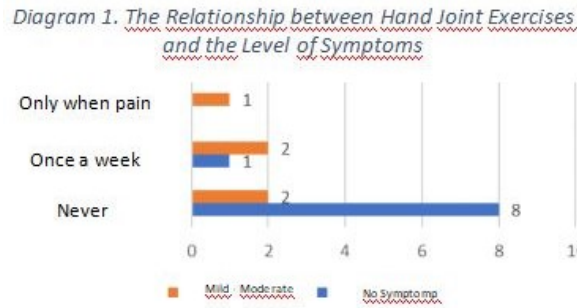


Table4. Wilcoxon Test Results

The Symptoms Level of Participants				Mean	The Decreased Symptoms	The Increased Symptoms	P-Value
No Symptoms	Mild	Medium					
Before Counseling	5	8	1	19,14			0,032
After Counseling	9	4	1	16,57	11	3	

Bivariate analysis used the Wilcoxon sum rank and signed rank methods because the number of participants was less than 30 people and the data distribution was not normal.

Based on the results of the Wilcoxon signed rank test, the obtained P-Value is 0.032. Related to the value of 0.032 is smaller than 0.05 (<0.05), it can be concluded that the hypothesis is accepted. This means that there is a difference between the results of the Pre-Test and Post-Test, so it can be concluded that "There is a relationship between counseling on hand joint space exercise and the level of symptoms of Carpal tunnel and Cubital tunnel syndrome experienced by Dental Health Students".

4. Discussion

The participants were 39 third year students of Dental Health, the Polytechnic of Health Sciences Jakarta I, all participants included in the pre-test had never received counseling related to Carpal tunnel syndrome and Cubital tunnel syndrome and had never done joint space exercise.

From a total of 39 participants, only 14 people were analyzed in the results because 25 participants did not take the post-test so that the testing method used nonparametric methods because the type of

data was nominal - ordinal and the number of participants was less than 30 so that the data distribution was not normal.

The results showed that of the 14 participants assessed from the total BCTQ score, 11 people experienced a decrease in symptoms while 3 people felt their symptoms getting worse. The results also show that 3 people do exercise once a week, 10 people never do exercise, and 1 person does exercise every time they feel sore or tingling. Some participants who answered that they never did exercise experienced a decrease in symptoms, while some participants who did exercise once a week experienced an increase in symptoms.

Carpal tunnel syndrome is the most common nerve disease of the hand with a prevalence in the general adult population ranging from 2.7 to 5.8 percent[9]. This shows that Carpal Tunnel Syndrome is a fairly serious health problem, accompanied by Cubital Tunnel Syndrome in the second position.

Prevention of Carpal tunnel syndrome and Cubital Tunnel Syndrome, one of which is by doing stretching exercises in the form of joint space exercise, as explained in that complaints of tingling and weakness in the hands which are symptoms of Carpal tunnel syndrome and Cubital Tunnel Syndrome are significantly reduced compared to before intervention[6]. The intervention carried out was hand exercise (stretching exercise) which was preceded by counseling about Carpal tunnel syndrome.

It can be concluded that the extension of hand joint space exercise has an influence on changes in the level of symptoms of Carpal tunnel syndrome and Cubital Tunnel Syndrome in students of Dental Health Polytechnic of Health Sciences Jakarta I.

Exercises on the hands and wrists for 4-5 minutes every hour and modification of hand activity can help reduce the risk of developing or preventing Carpal Tunnel Syndrome[10]. This explains the increase and decrease in symptoms felt by some participants.

Only doing gymnastics without being accompanied by modifications/changes in hand activity does not guarantee a decrease in the level of symptoms of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome. It is therefore possible that participants who did not modify hand activity experienced an increase in symptoms.

5. Obstacles

In this study, there were several obstacles that affected the results, including:

1. Limited human resources and time constraints so that objective testing cannot be done before counseling.
2. Initial participants totaled 39 people following pre-test and full counseling, 2 months into the post-test a pandemic occurred which closed the possibility of gathering participants to carry out the post-test.
3. Difficulty contacting each participant to do post-test through online so that only 14 participants took the post-test.

6. Conclusions and Suggestions

Based on the results of the study, several conclusions can be drawn as follows

1. There is an influence between hand joint space exercise and the level of symptoms of CTS and CuTS experienced by Dental Health Students, where there is a difference between the results of the Pre-Test and Post-Test.

2. From 14 people it is known that 6 people have CTS symptoms, 2 people have CuTS, and 6 people have both symptoms.
3. The number of participants experienced a decrease in symptoms of CTS and CuTS as many as 11 people.

From these findings, it can be concluded that hand joint space exercise accompanied by modification of hand activities is good to do in order to prevent the occurrence and reduce symptoms of CTS and CuTS for sufferers.

In this study the researchers put forward the following suggestions:

1. For Participants (Students of Dental Health Polytechnic of Health Sciences Jakarta I)
 - Performing Hand Joint Exercises regularly at least 5 times a day and Modifications / Changes in hand activities where each hand activity is given a break every 2 to 5 minutes and reduces the quantity of hand activities that are too heavy
2. For Institutions and the Academic Community
 - a. In addition to the questionnaire as a subjective test, researchers suggest that objective testing be carried out in making decisions on the level of symptoms so that the classification of the disease obtained can be more accurate.
 - b. In future research, it is suggested that the method and research plan be more structured in order to prevent participants from not following the entire research procedure.
 - c. In future studies, it is hoped that researchers will consider and study well in order to obtain developments in research.
3. For the general public

The public can learn and follow proper hand joint space exercise procedures so that they can prevent the occurrence of Carpal tunnel syndrome and Cubital tunnel syndrome

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