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The development of self-healing model with massage therapy and exercise therapy for a wrist injury

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Abstract: This research aims to produce a model of self-healing with massage therapy and exercise therapy for proper and effective wrist injury for the community to cure wrist injury. This research was development research with stage: preliminary study and data collection, planning, product draft development, expert validation, product testing, revision and evaluation. The subjects of small-scale test were 5 people, subjects were large-scale test and product effectiveness test was 10 people using minimum sample size formula at FIK UNY Physical Therapy Clinic and Masase Terapi Cedera Olahraga Metode Ali Satia Graha. The instruments used to collect data were expert validation sheets, questionnaire sheets, and goniometers to measure range of movement of wrist joints. The results showed that model of self-healing with massage therapy and exercise therapy in wrist injury was valid. The results of validation of material experts and media experts were included in the high category. Product quality from small-scale tests and large-scale tests was categorized as high. The results of product effectiveness test showed a significant reduction in pain complaints, increased motion function and increased range of movement (ROM). The conclusion of this study was a model of self-healing with massage therapy and exercise therapy valid and effective for a handling wrist injury.

Keywords: massage therapy, exercise therapy, wrist injury

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INTRODUCTION

The massive development of knowledge and technology has affected the decrease of physical activity in the form of fitness and healthy lifestyle of people. The statement above was from WHO wherefrom the finding, In the health sector, infectious diseases were the main cause of 58 million deaths in the world, including DM (2%), injuries (9%), cancer (13%), other chronic and chronic respiratory diseases (16%) and heart and blood vessel diseases. (30%). In line with the above statement, the Indonesian government in developing a national strategy has a mission to implement physical activity and healthy food patterns in implementing ways to prevent the reduction of non-communicable diseases (Organization, 2011). The above statement can be said that non-communicable diseases can harm physical fitness and health, one of which was an injury to human limbs. The conclusion above is based on the results of research at the Physical Therapy Clinic of Faculty of Sport Science, Yogyakarta State University in 2010 and 2011 by Graha (2012) there were 919 patients out of 7665 patients or 12% who had a hand injury.

Many injuries occur due to 2 factors, including: (1) Intrinsic factors, namely injuries caused by individual elements such as and extrinsic such as anatomical abnormalities, flexibility, strength and knowledge, while (2) Extrinsic factors were injuries due to influences from outside the individual, such as facilities and equipment, inadequate infrastructure, type of activity or sport, weather or environment (Garrison, 2001). That statement was in line with the statement of (Graha & Priyonoadi, 2009) types of injuries that occur in the human body movement include (1) waist injury, (2) shoulder injury, (3) ankle

injury, (4) knee injury, (5) wrist injury, (6) muscle stiffness and (7) muscle cramps. Especially in this study, the focus was on a wrist injury.

Wrist injury was often the result of accidents, heavy lifting, turning tools, opening objects and squeezing. The results of research by Geraets et al., (2010) stated that wrist injury occurs as a result of (1) trauma that occurs during accidents or sports activities, (2) certain conditions such as during pregnancy due to fluid retention in the body that compresses the carpal tunnel, causing disturbances. on the wrist, and (3) repetitive movements regardless of the ergonomics of daily activities or work. Reinforced by Lestaluhu (2017) explains that there were 3 types of injuries in the upper extremity Cumulative Trauma Disorders (CTD), including: (1) De Quervain's syndrome with 12%, (2) trigger finger with 32% and Carpal tunnel syndrome with a percentage of 40%. . In addition, Ihsan (2017) also examined from 21 samples stating that 100% had experienced cases of an ankle injury, 95.2% of shoulder injuries, 85.7% of hamstring injuries, 61.9% of a wrist injury, 57,1%, elbow injuries, 38.1%, hip injury, finger injury by 28.6%, heel injury by 23.8%.

Graha (2012) stated that various kinds of massage therapy have been implemented to improve athlete achievement which aims to decrease the risk of injury, some of them are massage therapy and exercise therapy. Massage can help to accelerate blood circulation, reduce pain, and helps position displaced joints due to sprains. By its development, many kinds of massage were used as the treatment and prevention for injury, such as Shiatsu, Trigger point massage, Tsubo, Acupunctur, Deep tissue massage *qigong*, Frirage massage and others (Hernowo& Ambardini, 2019). Exercise therapy was a kind of treatment to recover the injury or the improvement of health by measuring body movement patterns following the goals that have been set (Nugroho & Ambardini, 2016). The exercise program conducted can keep muscles to be flexible and also increase power, decrease stiffness and muscle contraction. Both of the therapies can help an athlete cope with injuries, so it was expected that they can have the highest achievement in every competition.

Massage therapy was beneficial to help someone who suffers from pain in muscles, ligaments or joints. The statement above was reinforced by Graha & Priyonoadi (2009) that physiologically, massage therapy causes some effects such as: accelerating blood circulation, decreasing the inflammation sign and making muscles relax, decreasing swelling, and positioning joints. The treatment of massage therapy that has been conducted needs further follow up action such as the giving of exercise. Reinforced by Arovah (2010) the implementation of exercise therapy was conducted to rehabilitate the patients and recover the function of the body. Reinforced by Yudiana et al. (2012), there were 3 aspects of exercise such as (1) flexibility, (2) power, and (3) muscle endurance which aim to improve the ROM of joint movement, muscle power, and muscle endurance.

The latest development of massage therapy to handle minor injury in Indonesia has been developed especially in the Faculty of Sports Science, Yogyakarta State University by the implementation of Ali Satia Graha massage method in 2013 regarding injury therapy massage which has obtained copyright. The method was implemented to students, masseurs, trainers, coaches, and the public as the implementation of massage practice to recover minor injuries with problems in muscles, ligaments, and joints by manipulating the massage, traction, and joint reposition.

Weerapong et al., (2005) explained that massage was a manipulation done by muscles and connective tissue with various kinds of massage techniques to improve the function of joint movement, the recovery process, inhibit the pain stimulus in nerves, and improve muscle comfort. Massage is conducted in the body in various ways, such as (1) pressing, (2) trilling, (3) shaking, (4) stroking, (5) and squeezing conducted manually or by using mechanical aids (Ningsih et al., 2017). Physiological massage was helpful to accelerate blood circulation, produces endorphins and make muscles relax. This statement was reinforced by Arovah (2009) to help: (1) reduce swelling in the chronic stage, (2) reduce pain perception, (3) reduce the pain and stiffness of nerves, (4) expand the range of joints movement, power, coordination, and function of muscles.

The exercise of physical movement activity process which was systematic and programmed conducted repeatedly, progressively, and individually, in the relatively long period which directs physiologically and psychologically with the targets set (Gormley & Hussey, 2009). The exercise was conducted well and regularly with the sport exercise principles which can give the improvement of fitness, meanwhile, the patients with injury will get physical rehabilitation. Giriwijoyo & Sidik (2012) described that a systematic and programmed exercise can physiologically give effects, such as (1) the maintenance of a joint range of motion (2) the stability of joints, (3) the power of muscles and tendon

(4) the more increasing function of nerves, (5) the reaction of movement on muscles which was getting better, (6) the bloodstream system in the body becomes more fluent and (7) the elasticity of blood vessel becomes more increase..

Based on the observation to the patients in a physical therapy clinic, Faculty of Sports Science, Yogyakarta State University conducted by the researchers obtain some findings such as: (1) the patient of minor wrist injury suffer from pain when doing some movements such as flexion, extension, radial deviation, ulna deviation, pronation, and supination, (2) the patients who suffer for a wrist injury after lifting a heavy load, (3) the wrist injury frequently reoccur because the extreme movement of anatomy and fatigues, (4) the patients who suffer for wrist injury choose complementary medication such as massage as the alternative for the minor injury recovery, (5) the patient who suffers for the minor wrist injury and already had massage therapy treatment need further treatment when they get the injury again.

METHODS

This study was a Research and Development. The product through some stages to create a self-healing model using massage therapy and exercise therapy on the wrist injury give some significance such as (1) reducing pain, (2) improving ROM and (3) recovering the function of joints movement.

The subjects of this study were the patients at the Physical Therapy Clinic, Faculty of Sport Science, Yogyakarta State University and Ali Satia Graha Massage Therapy Method**.** The sample was taken using the purposive sampling technique which is based on certain criteria set by the researchers. The population of the wrist injury patients was 80 people, the quantity of the subject was taken using the formula of minimal sample size (Hosmer et al., 1997), so the subject of small scale test was 5 people and the big scale test and effectivity test was 10 people.

The procedures of development conducted in this study adapts to the steps of Nana Syaodih Sukmadinata through the stages: (1) the preliminary study and data collection was conducted by finding out the source of problems in the field and also finding out the solution to solve them. The researchers conduct the interview with the therapist as an expert, patient who suffered from a wrist injury and data collection, and then it was conducted (2) the study was planned by making the model or method adjusted to the theory in obtaining the valid and effective results as the solution of the problems faced, therefore (3) the draft of massage therapy treatment was developed which consisted of 3 kinds of manipulation namely fiction, petrissage and traction, and joints reposition with 8 movements. The exercise therapy draft consisted of 4 loosening movements, 4 stretching movements, and 3 strengthening movements. The intensity of light exercise therapy until medium with category of the medium was 9 minutes. (4) The draft was validated by three experts which consisted the expert of learning therapy material, the expert of sports health, Mr. Han Kahana at Menur Studio as the expert of media. The validation result has been revised to perfect the products so it was decent to be tested. (5) The small scale stest to examine the model draft whether it was accepted by the patients by using questionnaires to collect the data. The data obtained will be a revision to the further test stage. (6) The big-scale test was conducted similarly to the previous, the difference was in the quantity of the samples. After through various processes of design, then (7) it was composed in the form of practical guidance which contained preparation guidance, the implementation and model evaluation in the form of guidebook and VCD. (8) The effectivity test was the further test on the product to see the achievement of the self-healing model with massage therapy and exercise on the wrist injury (Laws et al., 2013).

Types of initial data obtained on study this was qualitative data and quantitative data. Instrument in study this that was use test validity from expert Theory with sheet validation. Test try scale small and test try scale big use sheet questionnaire while quantitative data obtained in the effectiveness test with do it *pretest* and *posttest* on painful press, function motion and ROMs.

The material and media aspect validation questionnaire sheet aims to measure the validity of the material presented in the development media. This assessment questionnaire sheet uses a Likert scale with 4 alternative choices, namely Very Good (SB), Good (B), Fairly Good (CB) and Poor (K) . The instrument grid for material experts can be presented in table 1.

Table 1. Grid of Feasibility Test Instruments for Material Experts

Aspect	Indicator	Sub Indicator
Therapy and Health Sport	Theory	Movement therapy Principles of practice
	Videos	Narrative accuracy Image quality
	Benefits and Purpose	Safety to move Ease of movement The practicality of doing the move Overall modification

The instrument used by media experts was viewed from the aspect of video quality, with 3 indicators , 4 sub indicators in 10 questions. The instrument grid for material experts can be presented in Table 2.

Table 2. Grid of Feasibility Test Instruments for Media Experts

Aspect	Indicator	Sub Indicator
Media	Picture	Video quality
	Narrative	Narrative accuracy Use of letters
	Videos	Video Mods

The instrument trial was carried out on a small scales test of 5 people and a large scales trial of 10 people, this trial was reviewed from the material aspect and video quality by answering 10 questions.

Table 3. Instruments Trial Grid

Variable	Indicator	Sub Indicator
Self Healing Handling Model with Massage Therapy and Exercise Therapy for Wrist Injury	Theory	Movement therapy Principles of practice
	Videos	Narrative accuracy Image quality
	Benefits and Purpose	Safety to move Ease of movement The practicality of doing the move Overall modification

The data obtained at the expert validation stage, small-scale trials, and large-scale trials were in the form of very poor, good enough, good, and very good statements which are converted into quantitative data on a scale of 4, namely with a score from 1 to 4. The steps in data analysis include: (a) collecting rough data, (b) scoring, (c) the scores obtained are then converted into qualitative data. The clearer criteria can be seen in table 4.

Table 4. Categorization of Validation Score

Formula	Category
$X < (\mu\text{-}1.0\sigma)$	Low
$(\mu\text{-}1.0\sigma)\ X < (\mu\text{+}1.0\sigma)$	Currently
$(\mu\text{+}1.0\sigma)\ X$	Tall

Source: Sudijono (2012)

Information:
X = number score subject.
ideal mean = [(X x 4)+(X x 1)]
= standard _ ideal deviation = 1/6 [(X x 4)-(X x 1)]

Whereas quantitative data from *pretest* and *posttest* on painful press, function motion and ROMs. Test the effectiveness of the product using the experimental method one group pretest posttest. For analyze the data used test n on parametric *wilcoxon signed rank test* with using a significance level of 5% obtained probability value (p) that can be used to prove the hypothesis that there was or was not a significant effect. The results of the data show a significant difference if the p value <0.05 and if the p value> 0.05 then there is no significant difference.

RESULT AND DISCUSSION

Product assessment begins with the validation stage. The validation of the self-healing model with massage therapy and exercise therapy for wrist injury was carried out by 3 experts. The validation data from material experts on the self-healing model with massage therapy and exercise therapy for wrist injury was listed in table 5.

Table 5. The Result of Expert's Validation

Validator	Score	Maximum Score	Percentage	Category
Therapy Material Expert	30	40	75%	High
Health Sport Expert	31	40	77,5%	High
Media Expert	31	40	77,5%	High
Total	92	120	76,67%	High

The initial draft of the self-healing model with massage therapy and exercise therapy for wrist injury was validated. Based on the results of the assessment of the value scale of the material expert on the initial draft of the massage therapy and exercise therapy model, all questionnaire items received a good rating, the data obtained was then entered into the category norm. The validation data from material experts showed a total value of 30 which means the self-healing treatment model with massage therapy and exercise therapy for wrist injury is in the high category (30 X). However, the results of this expert validation still need to be improved.

The second validation was carried out sport health. Initial drafts of massage therapy and exercise therapy models were included in the category norm. The data from the validation results from material therapy experts shows a total value of 31 which means the self-healing treatment model with massage therapy and exercise therapy on wrist injury was in the high category (30 X). However, the results of this expert validation still need to be improved. The sports health expert's rating scale on items about safety, comfort, and practicality got a score of 4 or in the very good category. The scores on the items of ease, accuracy and modification overall get good categories, while the items on clarity of orders and duration of handling time were still in the good enough category. This shows the lack of clarity of orders on each treatment item, both massage therapy and exercise therapy. The items of duration and time have not been listed for each item of handling so that with time, the overall duration of handling can be known. Input data and suggestions on the validation of health sports experts include: increasing the intensity of treatment and adding exercise motion.

The validation of the self-healing model with massage therapy and exercise therapy for wrist injury was forwarded to media experts. Based on the results of the media expert's rating scale assessment of the initial draft of massage therapy and exercise therapy models were included in the category norm. The validation data from the material expert shows a total value of 31 which means that the self-healing treatment model with massage therapy and exercise therapy for wrist injury was in the high category (30 X). Getting a score in terms of letter accuracy and ease of understanding on the video gets a score of 4 in the very good category. Screen quality assessment items, narration, music, colour and overall presentation got a score of 3 or good category. The lowest score on image quality and volume of narration with a fairly good value category. This makes the improvements made by researchers as material for revision in product improvement. The quality on some screens was still not good and the volume is still not adjusted.

After the experts read the draft and observe the implementation of the model through the media, the experts then write suggestions for improvement on the suggestion sheet. The following are various inputs, including:

Table 6. Suggestion and Advice from the Experts

Validator	Suggestion and Advice
Expert 1	a. The unit of time is attached in the time instruction of each therapy to calculate the effectiveness.
Expert 2	a. Adding the intensity description and duration and purpose of massage therapy and exercise therapy. b. Adding the rolling move and pronation/supination.
Expert 3	a. The high and low narration volume is adjusted to make the stable volume. b. The quality of the pictures should be improved to make better vision.

There were several inputs from experts on the draft of developing a self-healing model with massage therapy and exercise therapy in a wrist injury. Input from expert 1 that each item handling both massage therapy and exercise therapy include a unit of time. The purpose of this input was so that the subject knows the overall duration of treatment in the self-healing model.

The input from expert 2, namely on the implementation program, include the intensity of handling. The purpose of increasing the intensity was so that the subject knows the intensity of each treatment, for example in flexibility exercise therapy with low intensity but moderate-intensity strength training with resistance. This movement was a movement that supports the wrist joint in daily activities such as opening doors and opening jars.

From expert 3, input was obtained, namely, the video when the image was enlarged it looks rough or blurry. You should take pictures by bringing the camera closer to the display so that the image quality was still good if the magnification was still not appropriate. In addition, another input was the volume of the narration. This means that the entire volume of the narration must be adjusted so that the sound level was the same from the beginning to the end of the video.

After receiving validation from experts and making improvements according to input from experts, the researchers conducted a small-scale test of the draft self-healing package with massage therapy and exercise therapy on wrist injuries of patients at the Physical Therapy Clinic, Faculty of Sport Science, Yogyakarta State University on Wednesday, October 5, 2018, with 5 people. After getting the 5 people, the subjects were given orders to draft the treatment at their respective homes according to the instructions in the guidebook and video.

Table 7. The Subject Assessment of Product Test

Subject Test Result	Score	Max. Score	Mean	SD	Percentage	Category
Small Scale Test	155	200	3,1	0,4629	77,5%	High
Big Scale Test	330	400	3,3	0,4605	82,5%	High

After small-scale test and product revisions have been carried out, then proceed to large-scale test. A large-scale test was carried out on 12-13 October 2018 at the Physical Therapy Clinic, Faculty of Sport Science, Yogyakarta State University and the Ali Satia Graha Sports Injury Therapy Massage, which are located at Plaza UNY, 4th floor, Jl Afandi Gejayan, Caturtunggal, Depok, Sleman. The number of subjects in the large-scale test was 10 patients.

Then, subjects were given a questionnaire in response to the product. After filling out the questionnaire of complaints experienced, the subject also filled out a questionnaire related to aspects of the product being developed. From the large-scale test, the data was obtained as seen in table 18.

Based on the assessment of the large-scale test of the product, all questionnaire items from the subject received a good rating and there was an increase from expert validation tests, as well as small-scale tests. In the large-scale test, input data and suggestions were obtained as product improvements, including packaging improvements, meaning that the final product is packaged properly and correctly, such as the use of cover paper and colour composition in books or VCD. The second wish is to add a video of movement manipulation techniques, as an example of a basic explanation of effleurage, petrissage and friction movements.

The results of the data analysis above describe the process of collecting and analyzing data carried out to test the feasibility of the product being developed. In general, the validator gets a good assessment of the product. From the user's point of view, the injured subject is considered good and the product was very helpful in recovering the injury. This was in line with the results of research by Fidiastuti & Rozhana (2016) explaining that model development products by providing manuals that have received revisions from material experts were aimed at improving the guidebooks, so that book readers or patients better understand the contents of the guidelines and can follow the directions that have been given. made.

After the feasibility test was complete then the product will be tested for effectiveness on 10 subjects, below was a distribution table for subjects based on other types.

Table 8. Distribution of Subjects' Gender

Gender	N	Percentage
Male	7	70%
Female	3	30%
Total	10	100%

Based on the table above, it was known that the most common types of disorders are men with a percentage of 70%. While 30% for women. Furthermore, a description of the subject data based on the duration of the injury and the cause of the injury was presented in table 5.

Table 9. Data of Period and Injury Cause

No	Period	Injury Cause
1	2 weeks	Lifting the gate
2	1 day	Hold the motorbike from falling
3	5 days	Lifting goods
4	2 weeks	Unidentified cause, pain when waking up
5	1 week	Falling from skateboard
6	1 month	Recurrence, injury when playing basket
7	3 days	Hoeing
8	1 week	Motorbike accident
9	1 week	Motorbike accident
10	5 days	Smash when playing Volleyball

The table above shows that at the time of injury, 8 of 10 subjects were in chronic conditions with a duration of 5 days to 2 weeks and 2 subjects in acute conditions with a duration of fewer than 3 days. Based on the cause of injury, 7 subjects suffered injuries due to trauma or impact and 3 subjects due to movement errors. In line with Puspitasari & Heynoek's research, (2017) The prevalence of wrist injury sufferers is more experienced by adults by 1.55% or 2.6 million. These cases are estimated to occur in 35% of women and 65% of men, usually between 40 and 60 years. Causes of injury that occur due to trauma, overuse, infection, endocrine disorders and excessive workload.

The product effectiveness test was carried out after the product test was completed and revised according to the suggestions and input from the product test. The effectiveness test was carried out at the Physical Therapy Clinic, Faculty of Sport Science, Yogyakarta State University and the Ali Satia Graha Sports Injury Therapy Massage Method. In this effectivity test, the researcher conducted 2 tests, namely pretest and posttest. Pretest data collection was carried out on October 16-18 2018, totalling 10 people. After taking pre-test data, the subjects were immediately given orders to carry out a model of handling massage therapy and exercise therapy and then carried out also at their respective homes according to the instructions in the guidebook and video. The post-test was conducted on October 18-20 2016, after the subject had handled the massage therapy model and exercise therapy 3 times.

Tenderness Pain

In the product effectiveness test, observing a decrease in the pain scale felt by subjects with a wrist injury, data on complaints of tenderness were obtained through questionnaires during pretest and posttest. The data obtained from the pain response when emphasized the wrist joint. The results of the calculation of pain complaints from lifting the pretest and posttest items are as follows:

Table 10. Data Analysis of Pain Suffers

Data	*Mean*	SD	Effect	Sig.	Note	Effectivity (%)
Pretest	6.4	1.955	4,4	0,005	Significant	62,5
Posttest	2.4	1.578				

Based on the results of descriptive analysis of pain complaints pretest data, the minimum value = 4, maximum = 10 and mean = 6.4. While the results of the posttest data analysis obtained the minimum value = 1, maximum = 5 and mean = 2.4. Pretest and posttest data increased by 4.4 with an effectiveness of 62.5%. The graph of pain reduction can be seen in Figure 25 below:

In the Wilcoxon signed-rank test on complaints of tenderness, the p-value <0.05 was 0.005. From these results, it can be concluded that there are significant differences in pain complaints before and after handling massage therapy and exercise therapy. In line with Djoar & Martha, (2019) in their research there was a significant difference in reducing wrist injury pain between the ultrasound group and the combination ultrasound group and mobilization exercises, this was related to the effect of mobilization exercises that stimulate the median nerve so that it helps improve venous circulation resulting in a reduction of pressure in the epineurium. Another study also conducted by Amin & Purnamasari, (2020) showed a p-value < 0.05 which means that there is an effect of massage therapy on reducing pain scale due to dysmenorrhea during menstruation because massage therapy helps relax the abdominal muscles and was by the gate control theory or neural response.

Motion Function

The achievement of the product's success was not only on the complaints of pain that are felt. On the criteria for the function of the wrist joint motion, tests were also carried out. The motion function measurement data was divided into 4 parts, including: (1) lifting things, (2) opening doors, (3) opening jars and (4) squeezing cloth. It can be shown as follows:

Table 11. Effectivity of Motion Function

Variable	Mean		Sig	Note	Increase	
	Pre	Post			Mean	Effectivity
Lifting goods	1	2.40	0.017	Significant	1.4	140 %
Opening the door	0.70	2.40	0.011	Significant	1.7	242 %
Opening the jar	0.80	2.40	0.016	Significant	1.6	200 %
Squeezing the clothes	0.80	2.30	0.010	Significant	1.5	187 %
					Average	192,25 %

Based on the table there was an increase in the function of the wrist joint motion. Judging from the data, the mean variable for picking up the items in the pretest was 1 and the post-test was 2.4, the mean for opening the door in the pretest was 0.7 and the posttest was 2.4, the mean for opening the jar variable was 0.8 for the pretest and 2.4 for the posttest and the last variable was squeezing the cloth in the pretest. of 0.8 and posttest of 2.3.

The biggest increase in the function of motion was opening the door with a value of 242%, then the movement of opening a jar was 200%, squeezing a cloth with a value of 187.5% and finally lifting goods = 140%. The analysis of motion function data was processed using the Wilcoxon signed-rank test with p <0.05. The results of the Wilcoxon signed-rank test above obtained a p-value <0.05, namely the motion function of lifting objects 0.017; open the door 0.011; open the jar 0.016; and squeeze cloth 0.010. From these results, it can be concluded that there were significant differences in motion function before and after handling massage therapy and exercise.

Range of Motion (ROM)

In addition to knowing pain complaints and motion function data felt by the subject, there was also measurement data for wrist joint ROM. This data was used to determine the range of motion of the injured joint before and after treatment. This measurement was carried out by the researcher after filling in the complaint data felt by the subject. The data measured were wrist joint motion data including flexion, extension, radial deviation and ulna deviation. ROM measurement data can be seen in the following explanation.

Table 12. Effectivity of Motion function

Variable	Mean		Sig	Note	Increase	
	Pre	Post			Mean	Effectivity
Flexion	55	65	0.011	Significant	10	18 %
Extension	61.4	73.4	0.017	Significant	12	19 %
Ulnar Deviation	12.8	18.7	0.007	Significant	5.9	46 %
Radial Deviation	18.6	28	0.007	Significant	9.4	50 %
					Average	32,5 %

Based on the table above, it shows an increase in flexion of 18.18%, extension with a value of 19.54%, radial deviation of 46.09% and the highest increase in ulna deviation = 50.53%

The analysis of motion function data was processed using the Wilcoxon signed rank test with p <0.05. The results of the Wilcoxon signed-rank test above obtained a p value <0.05, namely the flexion ROM of 0.011; extension 0.017; radial deviation 0.007; and ulnar deviation 0.007. From these results, it can be concluded that there were significant differences in ROM before and after handling massage therapy and exercise. In line with a research conducted by Utomo & Arofah, (2015) showed that there was a significant effect of Theraband exercise therapy on wrist injury then continued at the level of effectiveness of increasing flexion ROM by 95.08%, extension by 92.19%, abduction by 90.67 % and adduction of 96%.

The research results that have been obtained show the answers to the research questions described previously. From the results obtained, the following discussion was obtained. The first research question proved that the self-healing model with massage therapy and exercise therapy was feasible for a wrist injury. The results of the validation of material experts (therapists) showed a value of 30 with a high category, validation of material experts (health sports) showed a value of 31, with a high category and validation of media experts showed a value of 31 with a high category. The results of the validation show that the value was in the very high category, so the product of developing a self-healing treatment model with massage therapy and exercise therapy was feasible to be tested. In the small-scale test, 5 test subjects showed the results of the assessment in the high category, so that the results of the small-scale test showed that the product development was worthy of a large-scale tests. Large-scale test that have been conducted on 10 people show a high score. In line with Saputro et al. (2018) the development of tutorial modules or guidebooks was used as a medium for learning and understanding the steps in sequence to convey material so that the module product is used as an independent learning medium.

The massage therapy model uses a combination of manipulation with friction techniques, effleurage techniques, suppression (petrissage) for muscle relaxation, then repositioning the wrist joint according to the anatomical position (Harsanti & Graha, 2014). This movement was carried out independently so that it was safe and comfortable to handle because the massage pressure and withdrawal during joint repositioning can be controlled independently. The massage therapy model consists of 11 massage movements in the wrist muscles. This is reinforced by the research by Madenci et al., (2012) which explains that massage therapy treatment that is done independently has been proven to be significantly (p-value <0.05) in overcoming wrist injury, being able to reduce pain disorders and improving motion function. The results of other studies explain that massage and exercise in chronic injuries can increase ROM by 26.6% and reduce pain levels by 27.2% (Utomo & Kushartanti, 2019).

The process of healing and recovering wrist injury also uses exercise therapy treatment. The development of this product emphasized the strengthening and endurance of the wrist joint muscles. This therapy was used to increase muscle strength in receiving a given resistance. The second program of therapy affects increasing the degree of ROM, muscle strength and preventing repeated injuries. Agree with Walker et al., (2005) that joint injuries that were not followed by exercise therapy only reach 80% and exercise therapy complements the other 20% which reduces the risk of recurrence. The benefits of exercise therapy were also explained by Purnomo et al., (2017) to stimulate sensory motion, improve joint mobility, improve muscle physiology, increase neuromuscular coordination and joint relaxation. Reinforced research from a research conducted by Chanavirut et al., (2017) muscle strengthening as exercise therapy on the wrist was effective to prevent re-injury from happening.

This can be proven from the results of product development effectiveness tests that have been carried out by testing the effectiveness of massage therapy models and exercise therapy on wrist injury through the pretest and poster test stages and processed using SPSS 20 to obtain significant effectiveness values using the Wilcoxon test. The test results obtained that massage therapy and exercise therapy

models were stated to be significant with $p<0.05$, so this model is effective for the management of wrist injury. Salehi et al. (2016) explained that the management of wrist injury using a combination of massage therapy and exercise therapy has significant results in increasing ROM and reducing inflammation. Prasetyo (2015) revealed that severe injuries in the form of loss of motion function if not treated properly will interfere with daily activities so rehabilitation was needed which was a therapeutic service for injured athletes so that they have an optimal return. Reinforced by the statement Retnoningsih & Subyono (2015) explained that injuries require special treatment, one of which is therapy.

Based on the explanation above, the self-healing model with massage therapy and exercise therapy was feasible in terms of accuracy, safety, convenience and comfort and was effective in handling wrist injury. This explains that the product developed by the researcher can be accepted as a form of a handling wrist injury. The final product in this development research is in the form of books and videos of self-healing models using massage therapy and exercise therapy for a wrist injury.

CONCLUSION

Based on data analysis on the results of research that has been carried out, regarding the development of self-healing models with massage therapy and exercise therapy with expert validation an average of 76.67% then small-scale test with an average of 77.5% and 82.5% in the large-scale test so that the product was declared worthy in terms of accuracy, safety, convenience and comfort. The model consists of 11 massage therapy items and 13 exercise movement items. The duration of self-healing with massage therapy and exercise on wrist injury was 12 minutes. The self-healing model with massage therapy and exercise therapy was effective for reducing the degree of pain by 62.5%, increasing motion function by 192.25% and increasing ROM by 32.5%. Model products of massage therapy and exercise therapy were packaged in books and VCD.

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