The Different Effect of Hold Relax and Contrax Relax on Pain and Range of Motion in Knee Joint Osteoarthritis

Andi Halimah*, Sitti Muthiah
Health Polytechnic of Makassar, Physiotherapy Department
*Email: andihalimah66@gmail.com

ABSTRACT
The different effects of hold relax and contrax relax on pain and range of motion in knee joint osteoarthritis. This study aims was to determine the difference in the effect of hold relax and contrax relax on pain and range of motion in knee joint osteoarthritis. This study was an experimental study involving the treatment variables, namely hold relax and contrax relax, while the response variables were pain and range of motion of the knee joint. The research design was Quasy experiment with pretest-post test two group design. The study population was 20 patients with osteoarthritis at the Hospital Sayang Rakyat Makassar, the sample of the study were osteoarthritis patients referred to a physiotherapy clinic who met the inclusion and exclusion criteria as many as 20 people, with a purposive sampling technique divided into 2 (two) groups, each with a total of 20 people. 10 people. This study used VAS to measure pain before and after giving the intervention twice a week for 4 weeks. The results showed that there was no significant difference between hold relax and contract relax on reducing pain and ROM in patients. Both are good for treating painful conditions caused by knee joint osteoarthritis.

Keywords: Hold relax, Contrax relax, Pain, osteoarthritis

INTRODUCTION

Along with advances in science and technology, health service efforts are increasing and life expectancy is increasing (Yunus et al., 2016). However, on the other hand, the increasing life expectancy brings a burden on society, because the elderly population is increasing (Marlita et al., 2018).

In line with increasing age and increasing life expectancy, degenerative diseases are increasingly experienced by the adult and elderly population. One of the degenerative diseases that mostly affects adults and the elderly is degeneration of the joints, such as rheumatism.

In the elderly, there is a decrease in the function of body systems, including a decrease in bone density. One of the degenerative diseases that are often found in the elderly is osteoarthritis.

Osteoarthritis (OA) is a degeneration process in the joint cartilage that mostly affects the elderly. OA is the most common joint disease and knee OA ranks first. This is because the knee joint is the joint that receives the largest load when standing, walking and running. Topographically, the knee joint is located between the hip joint and the ankle joint so that it receives a large load from above and the load of gravity from below. While functionally, the knee joint is very important in various functional activities such as walking, running, kicking and squat-standing. The involvement of the knee joint in various activities and the large load it receives causes the knee joint to often be affected by osteoarthritis.

Knee OA is radiologically evident in the majority of patients over 65 years of age and is found in more than 80% of patients over 75 years of age. OA is the most common cause of disability, and knee OA is the most common cause of disability compared to other OA.

From Epidemiological data, it turns out that OA ranks first from the rheumatic group as a cause of disability. Its prevalence increases with increasing age, rarely occurs in people under 40 years of age and is more common in people over 60 years of age. Factors of age and sex indicate a difference in frequency.

According to WHO, 10% of the world's population aged > 60 years suffer from OA, 40% at age > 70 years suffer from knee OA and 80% of these OA sufferers experience movement disorders.

Osteoarthritis (OA) is the most common joint disorder in the United States. The number of people affected by OA is likely to increase due to population aging and obesity. Among adults aged 60 years or older, the symptoms of the disease are about 10% in men and 13% in women. While in Indonesia the prevalence of knee osteoarthritis is still quite high, namely 15.5% in men and 12.7% in women (Ismunandar et al., 2020).

Although osteoarthritis is not a life threat or does not directly cause death, arthritis can reduce a person's quality of life due to pain and joint motion disorders experienced by sufferers. Because OA patients experience pain and movement disorders, they require physiotherapy treatment such as interference.

Pain due to OA can be managed using physiotherapy modalities such as contrax relax and hold relax. Contract relax stretching involves isotonic contractions against resistance in the muscles experiencing tension, which is then followed by a relaxation phase. The purpose of giving contract relax stretching is to lengthen soft tissue structures such as muscles, fascia, tendons and ligaments so that it can increase LGS and decrease pain. While hold relax Hold relax with antagonist contraction is a technique using optimal isometric contraction of the shortened antagonist muscle group, then after going through the relaxation phase, the agonist muscle is contracted isotonic to stretch the antagonist muscle which is spasming or shortening. (Basmajian & Wolf, 1992). The purpose of antagonist isometric contraction is to obtain optimal relaxation after the muscles work optimally so as to break the myotatic reflex. This is known as the autogenic inhibition theory (Basmajian & Wolf, 1992).

On that basis, the authors are interested in examining the different effects of giving hold relax and contrax relax on changes in pain in Osteoarthritis Knee Joint.

METHOD

Research Design and Time

This research is a quasi-experimental study, namely quasi-experimental research that uses a comparison group against the group to be studied, where there are 2 sample groups to be studied to see which treatment or intervention is better or more effective. It is said to be false because several potential factors that affect the condition of the sample cannot be controlled so that it can affect the results of therapy. The study was conducted on June 16 – September 16 2020 at the Sayang Rakyat Hospital Makassar

Population and Sample

The target population was all patients with osteoarthritis during the study as many as 21 people. The sample of this study was 20 patients with osteoarthritis who were

divided into 2 (two) groups, each group consisted of 10 people for the hold relax treatment group and 10 people for the contract relax treatment group during the study. Samples were taken using a purposive sampling technique that met the inclusion criteria: patients diagnosed with osteoarthritis based on a doctor's diagnosis, aged 30 years and over, agreed to undergo physiotherapy as part of therapy, were willing to be the subjects of this study. Exclusion criteria: fracture, osteophorosis.

Data Collection Instruments

The tools or instruments used to facilitate the data collection process in this study were pain relief using VAS, ROM with a goniometer.

Data analysis

In analyzing the research data to be obtained, the researchers will use several statistical tests as follows:

a. Descriptive statistical test, to describe the characteristics of the sample based on age and gender.
b. Data normality test, using Shapiro Wilk test to find out the data is normally distributed ($p>0.05$) or not normally distributed ($p<0.05$).
c. Comparative analysis test (hypothesis test), if the results of the normality test of the data show that the data is normally distributed, then parametric statistical tests are used, namely paired t-test followed by independent t-test. If the results of the normality test of the data show that the data is not normally distributed, a non-parametric statistical test is used, namely the Wilcoxon test followed by the Mann Whitney test.

RESULT

This study uses a quasi-experimental type of research by using a pre-post test two group design. The study consisted of 20 samples, each consisting of 10 people in the treatment group with hold relax and 10 people in the treatment group with contrax relax. The measuring instrument used to evaluate the level of pain is the VAS where this instrument uses a score of 0-100 in assessing the intensity of pain. Another measuring tool is the Goniometer to measure the range of motion (ROM) of the knee joint.

The intervention given to the sample, for the first treatment group was hold relax while for the second treatment group was contra relax. Prior to intervention, a pretest was conducted to assess the intensity of pain before being given treatment. The intervention was given twice a week for 4 weeks, and the last intervention was measured again to assess changes in pain as a result of the post test.

Table 1 shows that the patients suffering from the hold relax treatment group were 4 men (40.0%) and 6 women (60.0%). In the treatment group with contract relax there were 4 men (40.0%) and 6 women (60.0%). Thus the results of the analysis show that there are more women than men.

Table 2 shows that patients suffering from osteoarthritis in both treatment groups were aged 50-59 years as many as 6 people (60%) in the hold relax treatment group and 7 people (70.0%).

Table 3. shows the results of the data normality test using the saphiro wilk test on pain values before and after the intervention. The test results showed p

<0.05 for pre-test pain, post-test pain, and post-test ROM and p>0.05 for pre-test ROM. This shows that the appropriate test for the hold relax group is the non-parametric test (Wilcoxon test).

Table 4. shows the results of the data normality test using the Shapiro Wilk test on pain values before and after the intervention. The test results showed p < 0.05 for post-test ROM and p-values > 0.05 for pre-test pain, post-test pain, and pre-test ROM. This indicates that the appropriate test for the contract relax group is a non-parametric test (Wilcoxon's test) for ROM and a parametric test for pain.

Table 5. shows that there is a difference in the effect of pain and ROM values before and after giving hold relax at a frequency of 2 times a week for 4 weeks with p = 0.002 and p = 0.011 (<0.05). This means that giving hold relax has an effect on reducing pain and increasing knee joint ROM.

Table 6 shows that there is a difference in the effect of pain and ROM values before and after giving contract relax at a frequency of 2 times a week for 4 weeks with p = 0.000 and p = 0.014 (<0.05). This means that giving contract relax has an effect on reducing pain and increasing knee joint ROM.

Table 7 shows the results of the Mann Whitney test for hypothesis testing, starting from the difference in pain and ROM values, each p value = 0.684 p = 0.912 (> 0.005) which means that there is no significant difference in the effect of giving hold relax with contract relax. However, on the average difference in pain reduction and ROM, contrax relax was better than hold relax.

DISCUSSION

The results of hypothesis testing using the Wilcoxon test showed that giving hold relax can reduce pain in patients. Pain in patients experienced a varied decrease, this was because each sample had a different activity after the intervention was given which this could not be controlled in this study. In the sample that experienced a large reduction in pain, it occurred because the patient was more cooperative in carrying out the intervention and the given home program.

This shows that hold relax can reduce pain due to osteoarthritis of the knee joint. Hold relax is a technique that aims to reduce pain and spasm. When a muscle contracts very strongly, especially if the tension becomes excessive, the contraction suddenly stops and the muscle relaxes. This relaxation is a response to very strong tension, which is called the inverse stretch reflex or autogenic inhibition and conforms to Sherrington's second law, namely if the muscle is stimulated to contract, the antagonist muscle receives the impulse for relaxation. (Adler et al., 2007).

This research is in line with research conducted by Sidiq & Pudjianto (2017) which states that there is an effect of giving hold relax to reduce knee osteoarthritis pain. This research is also in line with research conducted by Anshar et.al (2019) which states that Interference and Hold Relax have an effect on changes in pain and range of motion of the knee joint in patients with osteoarthritis. This research is also in line with research conducted by Wulandari et al (2019) which states that there is a significant effect between Modified Hold Relaxed on

reducing knee osteoarthritis pain in the elderly. This research is also in line with research conducted by Putra & Wahyuni (2019) which states that there is an increase in the range of joint motion by using the Hold Relax exercise therapy.

An important receptor in the inverse stretch reflex is the Golgi tendon organ, which consists of a woven collection of nerve endings protruding between the tendon fascicles. Fibers from the Golgi tendon organs include group 1b bermyeline nerve fibers which are fast-conducting sensory nerve fibers that end in the spinal cord in inhibitory neurons (inhibitory interneurons) which then end directly with motor neurons. These nerve fibers also carry out facilitation/excitatory connections with motor neurons that innervate antagonistic muscles (Adler et al., 2007). Reducing pain will increase ROM.

The results of hypothesis testing using the Wilcoxon test showed that giving contract relax can reduce pain in patients. Pain in patients experienced a varied decrease, this was because each sample had a different activity after the intervention was given which this could not be controlled in this study. In the sample that experienced a large reduction in pain, it occurred because the patient was more cooperative in carrying out the intervention and the given home program.

Contract relax is a technique that aims to reduce pain and spasm. The presence of an inhibitory autogenic effect produced by this technique can cause muscles to relax. The addition of stretching after contraction will produce a greater therapeutic effect, namely a decrease in muscle tension and muscle lengthening. When given stretching, there is stimulation of the Golgi tendon organ, muscle spindle, which is innervated by thick myelinated nerve fibers (propioceptors). The activity of thick myelinated nerve fibers will inhibit nocisensory activity which then inhibits the pathological muscle tension that occurs in the muscle. Reducing pain will increase ROM.

This study is in line with research conducted by Hendrik & Awal (2018) which states that giving the contract relax technique can have a significant effect on increasing knee joint ROM values due to osteoarthritis.

The results showed that after the intervention for both groups, the pain experienced by the sample did not really go away or healed, due to several factors that could not be controlled by the researcher, such as the level of activity carried out by each sample.

However, the results of hypothesis testing using the Mann-Whitney test showed that there was nothing more effective between contract relax and hold relax interventions for reducing pain in patients. Both groups have the same therapeutic effect, namely reducing pain. Reducing pain will increase ROM.

This research is in line with research conducted by Hendrik & Awal (2018) who stated that the hold relax technique and the contract relax technique had the same effect on increasing the ROM value of the knee joint in Osteoarthritis patients.

CONCLUSION

The conclusion in this study is that there is an effect of hold relax on decreasing pain and increasing ROM in

patients with osteoarthritis of the knee joint, there is an effect of contract relax on decreasing pain and increasing ROM in patients with osteoarthritis of the knee joint. There is no significant difference between hold relax and contract relax to decrease pain and increase ROM in patients. Both are good for treating pain conditions due to osteoarthritis of the knee joint.Suggestions that can be put forward by researchers are: pain that occurs due to knee joint osteoarthritis can be overcome by physiotherapy in the form of hold relax or contract relax to reduce or even eliminate pain complaints.

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ATTACHMENT

Table 1. Distribution of respondents by gender in RSUD Sayang Rakyat Makassar

Gender	Hold Relax Treatment Group		Contract Relax Treatment Group	
	f	%	f	%
Male	4	40,0	4	40,0
Female	6	60,0	6	60,0
Total	10	100,0	10	100,0

Table 2. Distribution of respondents by age di RSUD Sayang Rakyat Makassar

Age	Hold Relax Treatment Group		Contract Relax Treatment Group	
	f	%	f	%
40-59 years	6	60,0	7	70,0
60 years and over	43	40,0	3	30,0
Total	10	100,0	10	100,0

Table 3. Normality test results for pain data and ROM for the hold relax group

Measurement	mean	SD	p
Pretest pain	5,4	1,17	0,012
Post test pain	3,3	1,25	0,013
Pretest ROM	118,0	11,3	0,055
Post test ROM	124,5	8,9	0.000

Table 4. Normality test results for pain data and ROM for the contract relax group

Measurement	mean	SD	p
Pretest pain	5,3	1,56	0,14
Post test pain	3,1	2,17	0,45

Pretest ROM	118,0	12,2	0,46
Post test ROM	124,0	8,4	0,01

Table 5. Actual value of pain and ROM of knee joint OA patients before and after giving hold relax.

Measurement	mean	SD	min	mak	p
Pretest pain	5,4	1,17	4	7	0,002**
Post test pain	3,3	1,25	2	5	
Pain difference	2,1	0,31	3	2	
Pretest ROM	118,0	11,3	100	130	0,011**
Post test ROM	124,5	8,9	110	130	
ROM difference	6,5	4,7	10	10	

Information: ** Wilcoxon test

Tabel 6. Nilai aktualitas nyeri pasien sebelum dan sesudah pemberian contract relax

Measurement	mean	SD	min	mak	p
Pretest pain	5,3	1,56	3	7	0,000*
Post test pain	3,1	2,17	0	6	
Pain difference	2,2	0,78	3	2	
Pretest ROM	118,0	12,2	110	130	0,014**
Post test ROM	124,0	8,4	130	130	
ROM difference	6,0	5,1	0	10	

Information: *Paired sample t test ** Wilcoxon test

Table 7. Comparative analysis of the actual value of patient pain between the contract relax group and the hold relax group

Measurement	Mean	SD	p
The difference between pretest pain and post test contract relax	2,2	0,78	0,684
The difference between pre-test and post-test hold relax	2,1	0,31	
The difference between ROM pretest and post test contract relax	6,5	4,7	0.912
The difference between ROM pretest and post test hold relax	6,0	5,1	

Information: Uji Man Whitney