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Combination of Massage Therapy with Ultramagnetic Therapy: Does it Affect Shoulder Pain Rehabilitation?

Liza[1*], Bafirman[2], Masrun[3], Alimuddin[4], Desi Purnama Sari[5], Iit Selviani[6], Ardo Okilanda[7], Mikkey Anggara Suganda[8]
[1,2,4,6]Department of Sport Science,Universitas Negeri Padang
[3,5,7]Depatment of Coaching, Universitas Negeri Padang
[8]Department of Physical Education, Health and Recreation, Universitas Nahdlatul Ulama Cirebon

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Abstract

Introduction: Soulder pain is one of the causes of morbidity with a high prevalence due to excessive upper extremity movement. Therefore, special treatment is needed in dealing with shoulder pain in order to reduce pain.
Methods: This type of research is a quantitative research with an experimental design pre-experimental design with the *one group pre - test and post-test approach design*. In this study, the initial test (pretest) was carried out to find out the initial data from the research subject, namely *shoulder pain*. Furthermore, the researchers compiled the results of the initial test data (pretest), treatment/treatment of massage therapy and electromagnetic therapy. Therapy is given to patients 3 times a week for 3 weeks, then the final data measurement (Posttest) is carried out. The subjects of this study were volleyball athletes who had *shoulder pain injuries*. The number of research samples was 20 people who were given treatment. The subjects of this study were male and female volleyball athletes in Kuranji District with an age range of 17 years to 35 years.
Results: The results of this study showed that the combination of massage therapy and ultramagnetic therapy for shoulder pain rehabilitation showed a significance value of 0.000 <0.05, so there was a significant reduction in pain. Subsequent results from research data on the effect of a combination of massage therapy and electromagnetic therapy on the range of motion of the joints (ROM) Flexion and Abduction show a significance value of 0.000 <0.05, so these results prove a significant increase after being given massage therapy and therapy electromagnetic.
Conclusions: The findings of this study show that electromagnetic and massage therapy together improve joint range of motion (ROM) flexion and abduction and aid in the treatment of shoulder discomfort. In order to treat shoulder pain in athletes, a combination of electromagnetic therapy and massage therapy might be used.

Keywords: Shoulder Pain, Massage Therapy, Ultramagnetic Therapy

1. Introduction

Sport is the most important physical activity for society (Santos & Jatra, 2021) , which is needed for physical growth and development (Suganda, 2017) , and is very easy to do for both children and the elderly (Suryadi et al., 2022) . Several studies say that physical activity through sports will have a positive effect on fitness (Baek et al., 2020; González-Fernández et al., 2021; Suryadi et al., 2021) , that way the body will become healthy (Saputra & Wahyudi, 2022; Suganda, 2017) , contributing to physical, psychological and emotional well -being (Hughes et al., 2020) , as well as reducing the risk of disease (Meo et al., 2021; Suryadi, 2022; Suryadi & Rubiyatno, 2022) . However, excessive activity in training can actually cause the risk of injury in sports (Andersson et al., 2018; Summitt et al., 2016) . Injuries in sports activities are the most common things that occur both during training and matches (Ristolainen et al., 2012) , especially in sports that have high intensity and physical contact (Junaidi et al., 2018) . A study says early specialization in young athletes is a risk factor for injury (De la Rosa-Morillo et al., 2019) , one of which occurs in the upper extremities such as shoulder injuries or known as *shoulder pain.*

Shoulder pain is one of the causes of morbidity with a high prevalence (Perez-Palomares et al., 2009) , and is the second most common musculoskeletal disorder treated by physiotherapists (Elkhadir, 2016) . Shoulder injuries are one of the injuries that often occur, which is almost a third occurring during sports activities (Enger et al., 2019) , and has become a major concern of the United States military. (Eagle et al., 2018) . The high prevalence rate of experiencing shoulder pain is 43.5% in handball and judo athletes (de Oliveira et al., 2017) . In addition,

repetitive stress on the upper extremities, especially when serving in tennis court games, contributes to the high incidence of chronic shoulder injuries and acute injuries (Cirino & Colvin, 2022) , this is due to technical sports movements that are wrong or due to *overuse* and technical movements. high intensity. Several studies have stated that the high incidence of shoulder injuries commonly occurs when throwing in baseball (Fares et al., 2020) , handball (Andersson et al., 2018; Asker et al., 2017; Forthomme et al., 2018) , where in these sports physical contact often occurs, and this also has an impact on soccer goalkeepers (Ejnisman et al., 2016) . Various shoulder injuries that occur in performing upper limb sports activities are certainly a diagnostic and therapeutic challenge (Li et al., 2021) .

The solutions offered to treat this injury are massage therapy and electromagnetic therapy. Massage therapy, one of the most effective and widely used methods (Moyer et al., 2004) , is also one of the most common techniques used by athletes to recover and improve their athlete's performance after exercise. Other studies have proven that *sports massage* has an effect on sports anxiety in futsal athletes (Musrifin & Bausad, 2021) , blood flow (Priyonoadi et al., 2019) , injury rehabilitation (McAtee, 2020) , and flexibility (Ripai & Graha, 2019) . Furthermore , Markov, (2007) revealed that electromagnetic therapy is applied to promote bone healing, treating osteoarthritis and inflammatory diseases musculoskeletal system, relieve pain, promote healing and reduced flex and, also, very low frequency . While research evidence suggests that exercise should be a cornerstone of shoulder pain rehabilitation, the exact type and dosage of exercise is unclear (Brady et al., 2021) .
Subsequent benefits reduce the hypoalgesic response during the acute and delayed recovery period after eccentric exercise (Selim KAPLAN, 2014) . Massage therapy provides significant benefits for combat injuries for a veteran with PTSD (Rosenow & Munk, 2021) . Next, massage therapy helps increase circulation speed so that the use of lactate as an energy source is faster and the removal of lactate from the muscles (Purnomo, 2015) . Other research revealed that combining intermittent exercise with sports massage therapy further improves standing long jump and *sit up performance* , increases blood pressure, BMI, and self-confidence, and reduces suicidal tendencies. (Shen et al., 2021) . As for previous research, it was revealed that after being given sports massage therapy treatment, there was a decrease in lactic acid (Fahmi & Ashadi, 2019; Hendra Hasibuan & H. Jutalo, 2020; Ningsih et al., 2017) , pulse rate (Mubarak et al., 2020; Mulyono, 2016; Priyonoadi et al., 2020) , restoring heartbeat (Hidayat & Ibrahim, 2021) . Based on the solutions offered, massage therapy and electromagnetic therapy have the advantages of preventing, minimizing or even accelerate the recovery of symptoms caused by muscle damage due to training . Shoulder pain can be a major factor in the decline the ability to carry out daily activities with cause upper extremity dysfunction (Luime et al., 2004) .

Massage therapy and ultramagnetic therapy have an important role in healing new pain. Massage therapy can have an effect on reducing pain, stiffness, and functionality scores in the short term but not in the long term (Wu et al., 2022) . A study in the Netherlands found that therapists used soft tissue massage techniques to treat 91.6% of 119 patients with shoulder complaints, and exercise for 96.6% of patients. In 85% of cases, these treatments are used in combination (Karels et al., 2006) . Massage therapy performed on the rehabilitation of shoulder joint injuries using massage techniques by stroking (combining scouring techniques with rubbing techniques) who use the thumb to relax or relieve muscle tension. After that, withdrawals and returns are made shoulder joint or known as repositioning (Graha, 2013) . Research findings from a clinical perspective, the development of shoulder injury prevention and rehabilitation protocols may have significant implications (Kim et al., 2020) . In addition, the use of *Proprioceptive Neuromuscular Facilitation* (PNF) allows reducing pain and increasing the functionality of the upper limb. (Kalinkina et al., 2021) .

Although previously Graha, (2013) had conducted research on massage therapy treatment for the shoulder joints and Bagnato et al., (2016) electromagnetic field therapy. But no one has yet to continue this research in 2022, and in particular to combine massage therapy and ultramagnetic therapy for shoulder pain rehabilitation. By changing the shortwave characteristics of the applicator, the therapist can target the specific type he or she wishes to apply (Paolucci et al., 2019) . In addition, researchers have found that pulsed electromagnetic field therapy can be applied to accelerate wound healing, repair fractures, reduce hematomas and treat soft tissue injuries and inflammation (Bagnato et al., 2016) . Based on this statement, this is one of the gaps in which research is carried

out as well as the reason why this study is important. This research is to prove the effectiveness of a combination of massage therapy and ultramagnetic therapy for shoulder pain rehabilitation

2. Methods

Participant

The subjects of this study were volleyball athletes who had *shoulder pain injuries*. The number of research samples was 20 people who were given treatment. The subjects of this study were male and female volleyball athletes in Kuranji District. Based on the data obtained, the age of the subjects in this study ranged from 17 years to 35 years.

Procedure

This type of research is a quantitative research with an experimental design pre-experimental design with the *one group pre - test and post-test approach design*. In this study, the initial test (pretest) was carried out to find out the initial data from the research subject, namely *shoulder pain* . Furthermore, the researchers compiled the results of the initial test data (pretest), treatment/treatment of massage therapy and electromagnetic therapy. Therapy is given to patients 3 times a week for 3 weeks, then the final data measurement (Posttest) is carried out.

The instrument used in measuring *shoulder pain* is to reduce shoulder disability in *shoulder pain sufferers* as measured by SPADI (*Shoulder Pain and Disability Index*). *Shoulder Pain and Disability Index* (SPADI) is a questionnaire for individuals consisting of two dimensions, namely for pain and for functional activities. The first dimension is used to measure pain and the second dimension is to measure functional activity. Furthermore, the range of motion (ROM) was measured using a goniometer. The reduction in shoulder pain disability in *shoulder pain* sufferers was measured by SPADI (*Shoulder Pain and Disability Index*). Flexion and abduction movements based on range of motion (ROM). SPADI and ROM data were measured twice, once before and once after treatment a combination of massage therapy and electromagnetic therapy.

Data analysis

Research data were analyzed descriptively to provide a summary of research data and to facilitate the presentation of research data. Data that were normally distributed were analyzed using the t test to test the difference in mean pretest and posttest results and significance using SPSS 26 using a *paired sample test.*

3. Results

The description of the research data will be able to provide information on the effect of a combination of massage therapy and electromagnetic therapy on reducing *shoulder pain*. Based on table 1 on the pretest data for the combination treatment of massage therapy and electromagnetic therapy for reducing *shoulder pain,* the largest percentage is in the moderate disability category where the frequency value is 15 and the percentage value is 75%.

Table 1. Distribution of pretest data for massage therapy and electromagnetic therapy for reducing *shoulder pain*

No	Category *Disability Indexx*	Frequency	Percentage
1	0 - 20% : Mild disability	1	5%
2	20% - 40% : Moderate disability	15	75%
3	40% - 60% : Severe disability	4	20%
4	> 60% : Very severe disability	0	0
	Amount	**20**	**100**

Table 2 above shows the post-test data for the combined treatment of massage therapy and electromagnetic therapy for reducing *shoulder pain. The* largest percentage was in the mild disability category, namely a frequency value of 18 and a percentage value of 80%.

Table 2. Distribution of posttest data on massage therapy and electromagnetic therapy on reducing *shoulder pain*

No	Category *Disability Indexx*	Frequency	Percentage
1	0 - 20% : Mild disability	18	80%
2	20% - 40% : Moderate disability	2	20%
3	40% - 60% : Severe disability	0	0
4	> 60% : Very severe disability	0	0
	Amount	**20**	**100**

Table 3. One-Sample Kolmogorov-Smirnov Test

	Unstandardized Residuals
N	20
Test Statistics	0.106
asymp. Sig. (2-tailed)	.200 [c,d]

Based on the results of the normality test, it is known that the significance value is 0.200 > 0.05, so it can be concluded that the residual value contributes to normal. The results can be seen in table 3.

Table 4. T-test results for Shoulder Pain Rehabilitation data

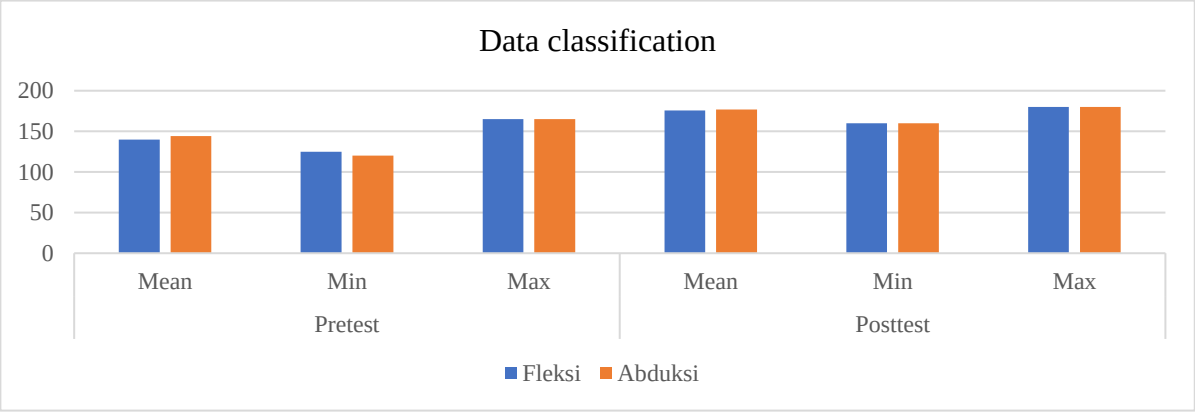
Data	test	t	Sig.(2-tailed)	Info
Shoulder Pain Rehabilitation	Pretest - Posttest	18,245	,000	Sig.

It is known that the sig.(2-tailed) value is 0.000 <0.05 which means "Ha is accepted" so there is an effect of a combination of massage therapy and electromagnetic therapy on reducing *shoulder pain* . The results can be seen in table 4.

a description of research data on the effect of a combination of massage therapy and electromagnetic therapy on the range of motion of the joints (ROM) as measured by the geniometer is presented as follows.

Table 5. Descriptive Analysis of ROM pre-test and post-test data

	Pretest			Posttest		
ROMS	**Means**	**Min**	**Max**	**Means**	**Min**	**Max**
flex	139.8	125	165	175.8	160	180
Abduction	144	120	165	177	160	180



Graph 1. Classification of Flexion and Abduction ROM data

Based on the data above, it can be seen from the ROM data that there is an increase in flexion and abduction after a combination of massage therapy and electromagnetic therapy with a post-test value in flexion movement with a mean value of 175.8 and in abduction movement with a mean value of 177.

Table 6. T-test results for Flexion and Abduction ROM data

Data	test	t	Sig.(2-tailed)	Info
flex	Pretest-Post test	-11,982	,000	Sig.
Abduction	Pretest-Post test	-8,861	,000	Sig.

4. Discussion

This study aims to prove the effectiveness of a combination of massage therapy and ultramagnetic therapy for *shoulder pain rehabilitation*. The results showed that the combination of massage therapy and electromagnetic therapy had a significant effect on reducing *shoulder pain.* Furthermore, the results of research data regarding the effect of a combination of massage therapy and electromagnetic therapy on the range of motion of the joints showed that there had been an increase in the mean posttest and pretest in flexion and abduction ROM or an increase of 36 in flexion ROM and 33 in abduction ROM. The results of the t test show that the count is greater than the t table. In addition, the results of the significance test show that the effect that occurs is significant. This means that a combination of massage therapy and ultramagnetic therapy is often given or carried out, hence *shoulder pain* rehabilitation will improve and the ROM will be wider. Based on these results, a combination of massage therapy and ultramagnetic therapy can be implemented for *shoulder pain* rehabilitation. The results of this study are supported by previous research which proved that performing traditional Thai massage (TTM) for four weeks can reduce pain intensity, pain threshold, cervical flexion, and left lateral flexion better (Areeudomwong et al., 2022) .

It turns out that doing massage therapy can restore joints that are in the position of the two joints towards attachment to normal joints after obtaining space from pulling/traction without experiencing friction between the two joints so that the ROM in the moving joints can be normal and not stiff (Graha, 2013) . Therefore, an effective recovery option is to identify risk factors and rehabilitation (De la Rosa-Morillo et al., 2019) , so this can be a reference in exercising again (Schwank et al., 2022) . Massage therapy is an asset in recovery from post-exercise muscle injuries, and can increase the resolution of systemic inflammatory signals (White et al., 2020) . In addition, a study has also proven pulsed electromagnetic field therapy helps in wound healing, reduces hematomas, repairs fractures, and soft tissue inflammation (Bagnato et al., 2016) . This presentation has provided an overview of massage therapy and electromagnetic therapy providing many benefits to the body, so this is good to apply.

Other research, massage therapy with moderate pressure can reduce stress (Field, 2019b), beneficial effects for various conditions such as premature babies, skin conditions, pain syndromes including arthritis and fibromyalgia (Field, 2016), and has a positive effect on pediatric conditions (Field, 2019a). Positive effects have also been experienced in athletics by applying massage therapy (Guo et al., 2021). Research findings prove that massage therapy facilitates adaptive changes in the somatosensory cortex where this leads to injury recovery and peripheral nerve repair (Xing et al., 2021). The importance of massage therapy has been highlighted in reducing headaches, dizziness, and nausea in concussion recovery (Burns, 2015), whereas manual therapy has a positive effect on pain in adults (Chen et al., 2018). These findings show the importance of massage therapy in post-injury recovery. Furthermore, premedication with gabapentinoids can improve the quality of postoperative rehabilitation after laparoscopic cholecystectomy by reducing postoperative shoulder pain, reducing the incidence of PONV, and improving sleep quality during the first postoperative night (Nakhli et al., 2018). A study by (Johansson, Cools, Gabbett, Fernandez-Fernandez, & Skillgate, 2022) said the benefits of consistency in providing training loads may be beneficial for complaints of shoulder injuries in teenage tennis players, so evaluation and treatment need to be carried out (Cirino & Colvin, 2022). Shoulder injuries are of particular concern early in a player's career (Liaghat et al., 2021), hence the need for a prevention strategy (Leahy et al., 2021). Based on this statement, the researcher combined massage therapy and ultramagnetic therapy for shoulder pain rehabilitation

Conclusion

The results of the research and discussion have a strong foundation for massage therapy and ultramagnetic therapy for shoulder pain rehabilitation, on the basis of references from previous studies that have been conducted which are listed in the discussion of results and discussion. The results of this study are the effect of a combination of massage therapy and ultramagnetic therapy on shoulder pain rehabilitation, which shows significant pain reduction results. The results of this study also prove that the combination of massage therapy and electromagnetic therapy provides a significant increase in the flexion and abduction joint range of motion (ROM). Based on these results, this study provides new evidence regarding shoulder pain rehabilitation in athletes. Therefore, these results indicate that a combination of massage therapy and ultramagnetic therapy can be used for athletes who experience shoulder pain so that it will speed up recovery from injuries. Recommendations for further research can compare the effects of massage therapy and ultramagnetic therapy on athletes who experience shoulder pain with a wider sample and population.

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