

RANGE OF MOTION (ROM) EXERCISES IN POST-OPERATIONAL PATIENT POST OPEN REDUCTION INTERNAL FIXATION (ORIF) MANAGEMENT

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ABSTRACT

The medical action that can be taken in dealing with fracture conditions is to perform an Open Reduction Internal Fixation (ORIF) procedure. When the bone fragments have been reduced, and the fixation device has been installed, it will cause severe pain. Non-pharmacological pain management can be done in ORIF postoperative patients by doing Range of Motion (ROM) exercises. This research was conducted at Koja Hospital in May - June 2023. The aim of this study was to determine the effectiveness of ROM on pain intensity in post-ORIF Extremity patients immediately, carried out on the 2nd day after surgery, 4 times in 2 consecutive days. Each movement is repeated 8 times with 30 minutes of practice time. The research method uses quantitative research with Quasi-experimental pre-a post-tests without control. The number of samples was 18 postoperative ORIF extremity patient respondents who were measured by Numeric Rating Scale (NRS) pain before and after ROM exercises. The results showed that there was an effect of ROM training on the pain intensity of postoperative ORIF patients using the Paired T-Test with a p-value of $0.000 < \alpha 0.05$, and it was found that there was a decrease in the average pain scale from before ROM 5.50 to a pain scale of 3.83 after ROM training. The conclusion is that ROM exercises are effective in reducing pain in postoperative ORIF Extremity patients at Koja Hospital.

Keywords: Fracture, Postoperative pain intensity, Range of Motion

ABSTRAK

Tindakan medis yang bisa dilakukan dalam menangani kondisi fraktur adalah dengan melakukan tindakan *Open Reduction Internal Fixation* (ORIF). Ketika fragmen tulang telah tereduksi, dan pemasangan alat fiksasi telah dilakukan, maka akan menimbulkan nyeri yang hebat. Manajemen nyeri secara non farmakologi yang bisa dilakukan pada pasien *post* operasi ORIF adalah dengan melakukan latihan *Range of Motion* (ROM). Penelitian ini dilakukan di RSUD Koja pada bulan Mei – Juni 2023. Tujuan dalam penelitian ini adalah ingin mengetahui efektivitas ROM terhadap intensitas nyeri pada pasien *post* ORIF Ekstermitas segera, dilakukan pada hari ke 2 setelah operasi, sebanyak 4 kali dalam waktu 2 hari berturut – turut. Dalam setiap gerakan diulangi sebanyak 8 kali dengan waktu latihan 30 menit. Metode penelitian dengan menggunakan penelitian kuantitatif dengan *Quasi experimental pre and post test without control*. Jumlah sampel sebanyak 18 responden pasien *post* operasi ORIF ekstermitas yang dilakukan pengukuran nyeri *Numeric Rating Scale* (NRS) sebelum dan sesudah dilakukan latihan ROM. Hasil penelitian menunjukkan adanya pengaruh latihan ROM terhadap intensitas nyeri pasien *post* operasi ORIF dengan menggunakan Uji *Paired T-Test* dengan nilai *p value* $0,000 < \text{dari } \alpha 0,05$, dan ditemukan adanya penurunan rata – rata skala nyeri dari sebelum dilakukan ROM 5,50 menjadi skala nyeri 3,83 setelah dilakukan latihan ROM. Kesimpulannya adalah latihan ROM efektif dalam mengurangi nyeri pada pasien *post* operasi ORIF Ekstermitas di RSUD Koja.

Kata Kunci : Fraktur, Intensitas nyeri post operasi, Range of Motion

PENDAHULUAN

Fracture is a term in which the condition of loss of continuity of bone, cartilage, which by its nature is differentiated into a total fracture or a partial fracture. A fracture is also said to be a break in the continuity of the bone structure, in which the state of the bone fragments shifts. It is said to be a closed fracture if the condition of the skin at the fracture site is still intact, whereas it is said to be an open fracture if the fracture penetrates the skin.

There are several medical measures that can be taken to treat fracture conditions. Closed reduction can be done if the fracture position has returned to normal without having to do surgery. As for more complicated fracture conditions, Open Reduction Internal Fixation (ORIF) can be done. ORIF is an operative treatment for fracture conditions where surgical treatment is carried out with the principle of returning the fracture to its original position. Fracture fixation applied by ORIF minimizes movement of the damaged bone. This creates optimal conditions for accelerating vascularization thereby speeding up the recovery of the bones and surrounding tissue (Claes, 2021).

When the bone fragments have been reduced, and the fixation device has been installed, it will cause severe pain because the fixation device penetrates the bone and an inflammatory process occurs which is characterized by swelling or tissue edema in the attached area. Pain is an unpleasant sensory and emotional experience due to the actual tissue damage that is felt at the site of the broken skin continuity. Some of the physical responses that occur when the body experiences pain are changes in general condition, body temperature, pulse, body posture, and shock. Optimal control must be exercised in the management of pain in postoperative ORIF patients so that it does not become chronic pain and complications.

In an effort to treat pain in post-ORIF patients, management includes pharmacological and non-pharmacological measures. Pharmacological action is a collaborative action carried out by doctors by providing analgesics according to the needs of the patient. Meanwhile, non-pharmacological actions are actions that are used to support pharmacological techniques carried out by doctors using simple methods (Pratiwi et al., 2020).

One of the non-pharmacological pain management that post-ORIF patients can do is to do Range of Motion (ROM) Exercises. Doing ROM exercises is one technique that can be used to reduce pain because it can maintain muscle strength, improve blood circulation, and maintain joint mobility (Budiharto et al., 2019). It is hoped that when patients carry out joint movements with ROM exercises, the pain in postoperative ORIF patients will decrease (Purba et al., 2022). These exercises can be done immediately on day 2 after ORIF surgery, where the effectiveness of ROM exercises immediately after surgery is obtained compared to delaying ROM exercises after surgery in terms of reducing pain (Iliopoulos & Galanis, 2020). To get maximum results, ROM must be repeated about 4 times and done at least 2 times a day for at least 2 consecutive days and can be done the 2nd day after surgery (M & al Fajri, 2021).

Healthy Home for Jakarta Koja Hospital is a trauma referral hospital located in DKI Jakarta, especially North Jakarta. Data obtained from the medical records of Koja Hospital, there were 25 trauma cases handled in the Koja Hospital Operation Room, and 19 of them underwent Open Reduction Internal Fixation (ORIF) procedures. Whereas in December 2022 at the Koja Hospital, there were 36 cases of trauma and 25 of them were carried out by ORIF. This means that there is an increase in the number of cases of patients undergoing ORIF at Koja Hospital. Data obtained from medical records of inpatient care at Koja Hospital in 2022, it was found that the average length of stay for Postoperative ORIF patients at Koja Hospital was 2-5 days according to the patient's condition.

The results of a research study conducted by Baiturrahman (2019), and Dahlia Purba et al (2019), stated that there was a significant effect of ROM training on pain intensity in postoperative ORIF Extremity patients. There are differences in the training procedures carried out in the study.

Among them is Baiturahman's research, the exercises were carried out for 3 days with 20 minutes and 5 repetitions of each movement and pain measurement using the *Non Verbal Adult Pain Scale* (NVPS). While the research conducted by Dahlia Purba et al., the research was carried out by providing counseling, discussion, and training regarding ROM in Upper Extremity ORIF postoperative patients. In contrast to the study conducted by Gutierrez (2021), where researchers compared the effectiveness of ROM in patients 6 weeks after ORIF and 3 months after ORIF where the results obtained were that ROM was more effective in patients 6 weeks after ORIF. It can be concluded that ROM exercises are more effective immediately after surgery.

The purpose of this study was to determine the effectiveness of Range of Motion (ROM) exercises on pain intensity in postoperative ORIF extremities patients, by doing the exercises 4 times in 2 consecutive days, where each movement was repeated 8 times for 30 minutes.

METHODE

Characteristics dan Research Design

This study uses quantitative research methods with pre-experimental research types. The design used in this study was a Quasi-experimental pre and post-test without control, where in this study there was no control (comparison) group, but in this study design the initial measurement (pretest) of pain scores was carried out in ORIF postoperative patients and carried out measurements (posttest) pain score to compare the changes that have occurred after the ROM exercise experiment.

1. The inclusion criteria in this study were:
 - a. Post ORIF patients on the upper and lower extremities
 - b. The post-ORIF patient is in a stable condition, namely vital signs are normal and fully conscious.
 - c. Patients who can determine or choose a pain score according to the state of pain felt.
 - d. Post ORIF patients using plates and screws.
 - e. Patients with a minimum number of days of hospitalization of 2 days after surgery.
2. The exclusion criteria in this study were:
 - a. Post ORIF patients who are intolerant to movement (heart disease and bedrest patients).
 - b. Post ORIF patients with decreased consciousness.
 - c. Patients with joint and bone disorders.
 - d. Post ORIF patients with double plate installation.
 - e. Post ORIF patients with open wound conditions.

Sampling Procedure

The sampling technique used in this study is non-probability using purposive sampling. Based on the sample calculation using the Federer formula and avoiding Drop Out, a sample of 18 respondents was obtained.

Size and Covariates

This study uses two instruments in collecting data. In the independent variable Range of Motion (ROM) exercises, the researchers used Standard Operating Procedures (SOP) for ROM exercises which consisted of the meaning, purpose, indications, and management of ROM exercises on extremities with internal fixation as fracture management. The dependent variable of pain intensity uses the Numeric Rating Scale (NRS) research instrument.

The research procedures carried out in this study were:

1. Research permit: research permit and ethical test with ethical number 34/KOME/2023

2. Before Intervention (Pre): determining respondents according to the inclusion and exclusion criteria, then informed consent is carried out. The researcher conducted an initial examination of pre-test pain scores in post-ORIF surgery patients on the 2nd day of post-ORIF surgery in the inpatient room.
3. Intervention: ROM exercises were carried out by physiotherapists on the 2nd day after ORIF's operation in the ward, 4 times in 2 consecutive days. In each movement repeated 8 repetitions with 30 practice times.
4. After the intervention (Post):

Data analysis

1. Univariate analysis
Frequency distribution of pain scores before and after ROM exercises in postoperative ORIF Extremity patients
2. Bivariate analysis
Knowing the effect of ROM training on pain intensity in patients with postoperative ORIF Extremities.

RESULT AND DISCUSS

1. Univariate analysis

Table 1

Frequency distribution of pain scales in patients with postoperative ORIF extremity before ROM exercises

No	Skala Nyeri (NRS)	Frekuensi	Persentase (%)	Mean
1	Comfortable (no pain) (0)	0	0	5,50
2	Mild (1 – 3)	0	0	
3	Moderate (4 – 6)	15	83,3	
4	Severe (7 – 10)	3	16,7	
TOTAL		18	100	

Table 1 shows that the pain scale distribution of 18 patients with post-ORIF extremity surgery before ROM exercises was 83.3% of patients with a moderate pain scale. While the remaining 16.7% of patients with severe pain scale. With an average pain score of 5.50.

The results of data processing are supported by the theory that one of the problems that arose after the patient underwent ORIF was pain. Where the complaints that are often complained of by post-ORIF patients are like a burning sensation, stabbed on the first day. On the first day of the fracture patient's bone healing phase is the damage or hematoma phase, where there will be bleeding around the fracture which will cause a painful response in the patient (Haryono & Putri, 2019).

The impact on fractures includes activity limitations, pain due to motor and sensory nerve activity in the fracture tissue. Pain is something that is subjective, no two people experience the same pain and no two painful events result in the same response or feelings in individuals. Pain is an unpleasant sensory and emotional experience resulting from actual or potential tissue damage. Pain occurs in many disease processes or together with several diagnostic tests, surgeries, and treatments (Budiharto et al., 2019).

At the time of the fracture, there will be a change in the structure of the bone due to damage, which can result in impaired function of the limbs and cause pain in the area that has a fracture, because of this a person can experience barriers to physical mobility (Wantoro et al., 2020).

This is consistent with the results of research conducted by Purba, et al (2021) which showed that the level of pain before ROM exercises was moderate pain (Purba et al., 2021). The results of another study conducted by Ayu Kurnia (2020) found that the average pain scale obtained was moderate pain (Kurnia, 2020).

Based on the results of the study on the effectiveness of ROM exercises in postoperative ORIF Extremity patients at Koja Hospital and the supporting theory above, the researchers concluded that the pain felt by patients before ROM exercises was moderate pain with a pain score of 4 – 6 because the hematoma was still ongoing in the fracture area. can cause pain.

Table 2

Frequency distribution of postoperative ORIF extremity pain scale after ROM exercises

No	Skala Nyeri (NRS)	Frekuensi	Persentase (%)	Mean
1	Comfortable (no pain) (0)	0	0	3,83
2	Mild (1 – 3)	6	33,3	
3	Moderate (4 – 6)	12	66,7	
4	Severe (7 – 10)	0	0	
TOTAL		18	100	

Table 2 shows that the pain scale distribution of 18 postoperative ORIF extremity patients after ROM exercises was 66.7% of patients with a moderate pain scale. While the remaining 33.3% of patients with mild pain scale. With an average pain score of 3.83.

These results indicate that there is a tendency to decrease the average pain scale in postoperative ORIF extremity patients after ROM exercises. ROM exercise is one of the treatment efforts in physiotherapy whose management uses body movement exercises, both actively and passively. The goal is rehabilitation to overcome functional and movement disorders, prevent complications, reduce pain and edema, and train functional activities due to surgery (Purbal et al., 2021).

ROM exercises aim to maximize the oxygen supply to the brain and throughout the body, improve blood circulation, and stretch muscles and joints so that there is a muscle relaxation reaction that can reduce pain in patients (Haryono & Putri, 2019). The pain experienced by the patient makes the patient afraid to move the injured extremity, so that the patient tends to lie down for a long time, allowing the body to remain stiff. Therefore a nurse needs to provide information to the patient and the patient's family about non-pharmacological therapies that can help patients eliminate or reduce pain, namely mobilization or range of motion (Budiharto et al., 2019)

According to research conducted by Sasongko et al (2019), the average pain score decreased after an intervention to mild pain (Sasongko et al., 2019). is after ROM is mild pain (Budiharto et al., 2019).

Based on the results of the study on the effectiveness of ROM exercises in postoperative ORIF Extremity patients at Koja Hospital and the supporting theory above, the researchers concluded that there was a tendency to decrease pain intensity after ROM exercises in postoperative ORIF patients. This pain reduction is a mechanism obtained from the relaxing effect on the muscles which will provide a sense of comfort so that the pain felt by the patient will decrease.

1. Bivariate analysis

Table 3

Effect of ROM training on pain intensity in postoperative ORIF Extremity patients at Koja Hospital in 2023

Pain Score	N	Mean	Sig. (2-tailed)	95% CI	Correlation
Pre Test	18	1,667	0,000	1,326 – 2,008	0,809
Post Test	18				

Table 3 shows the results of data processing using the Paired T-Test with a p value of 0.000 <from α 0.05 so that it can be concluded that H1 means that there is an effect of ROM training on pain intensity in postoperative patients with extremity ORIF at Koja Hospital. With a positive

value of Mean = 1.667, the 95% Confidence Interval value is 1.326 - 2.008 and the Correlation value is 0.809 which means there is a relationship between the two variables and there is a tendency to decrease pain scores after ROM exercises in postoperative extremity ORIF patients at Koja Hospital.

In this study, researchers did not replace pain management with analgesic therapy with ROM exercises. But how does this ROM exercise work together with giving analgesics in reducing pain in patients? So other factors will be found that can affect the intensity of pain in patients. Researchers measured the pain scale before being given analgesics or a few hours after being given analgesics, in order to get more optimal results of measuring pain intensity.

ROM exercises were immediately carried out on the 2nd day after surgery, which was carried out 4 times in 2 consecutive days. In each movement repeated 8 repetitions with a training time of 30 minutes. From the clinical results obtained from observations and interviews with respondents after ROM exercises, it was found that there was reduced pain reporting from respondents. When observed in the surgical wound area there was a decrease in swelling on the 2nd day compared to the first day after the ORIF procedure. Respondents have started to look like they want to move the extremities that are carried out by ORIF. Apart from that, from the results of interviews, the average respondent said he could take a break because there were reduced muscle spasms in the operating area. From this data, the researchers argue that the reduced pain in the respondents is due to oxygen circulation and blood circulation becoming smoother.

Post-ORIF surgery can cause the formation of prostaglandins which cause a swelling response, where there is a disturbance in the circulation of oxygenation and blood circulation which will lead to a buildup of the chemical potassium or lactic acid. By doing ROM exercises, it can help break down the buildup of potassium or lactic acid chemicals, so that blood circulation and oxygenation get better, increase joint mobilization, increase bone mass, provide comfort to respondents because pain is reduced, increase relaxation and can help absorb nutrients and drugs. well absorbed (Budiharto et al., 2019).

According to research conducted by Risnah et al (2019) it can be concluded that there is an effect of active ROM exercises on pain in postoperative tibial fracture patients. ROM performed early after surgery is a treatment effort whose management uses motion exercises both actively and passively. ROM is given to overcome movement function disorders, prevent complications, reduce pain and edema and train activities due to surgery. ROM is given to parts that are easy to contract and relax, so that patients who have undergone surgery do not experience muscle stiffness. The hope is that reduced muscle stiffness will also have an impact on reducing pain (Ulfah Azhar et al., 2019).

In line with the research conducted by Baiturahman et al (2019), it can be concluded that there was a change in the pain scale before and after being given the exercise range of motion intervention for 3 days to the respondents. Performing ROM movements is one technique that can be used to reduce pain because it can maintain muscle strength, improve blood circulation, and maintain mobility. ROM exercises from an early age can also improve blood circulation so that oxygenation of the wound becomes better, intake of nutrients and drugs can be absorbed properly (Budiharto et al., 2019).

Based on the results obtained from research conducted by researchers, it was found that there was an effect of Range of Motion (ROM) exercises on pain intensity in postoperative ORIF Extremity patients at Koja Hospital, with a tendency to decrease pain scores after ROM exercises. From the results of research data processing and supporting theory above, researchers argue that ROM exercises can be carried out early after surgery as a non-pharmacological therapeutic measure in postoperative ORIF extremity patients, either carried out by health workers or carried out by the patients themselves for a longer time after treatment. in the hospital. ROM exercises

are useful in reducing pain and as a way to speed up wound healing and can also prevent complications in post-ORIF surgery patients.

RESEARCH OF LIMITATIONS

In carrying out this research there are limitations and deficiencies that researchers get which can allow for the non-optimality of the results of this study, including:

1. The hospital allows intervention to be carried out by physiotherapists, so they cannot intervene according to the time the researcher has. Researchers must adjust the time with physiotherapists so that research time becomes more limited.
2. Researchers cannot control the administration of analgesics to patients which is another factor that can affect the results of interventions in reducing pain in patients.

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion

ORIF is an operative procedure in fracture patients that causes pain. Non-pharmacological therapy that can be used to reduce pain in postoperative ORIF patients is to do Range of Motion (ROM) exercises. ROM exercises carried out at Koja Hospital are by doing exercises 4 times in 2 consecutive days, where each movement is repeated 8 times for 30 minutes. The results obtained are that it can be concluded that there is an effect of ROM training on pain intensity in postoperative ORIF patients and there is a tendency to decrease the average pain scale in postoperative ORIF patients after being given ROM exercises from an average pain scale of 5.50 to a pain scale of 3.83. It is hoped that this procedure can be carried out continuously and can have an impact that can be used as a non-pharmacological measure for pain management.

2. Recommendation

This research can be used as study material whose limitations can be criticized. So that it is hoped that it will perfect the ROM exercise procedure in reducing pain in postoperative ORIF Extremity patients.

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