# Application Of Range Of Motion (ROM) Therapy To Increase The Strength Of The Extremity Muscles In Patients With Stroke : A Literature Review

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**ABSTRACT**

A stroke is a condition of injury to the brain that occurs due to an obstructed blood flow to the brain. Patients who have had a stroke often show weakness in the limbs. The main nursing problems experienced by individuals who have had a stroke include physical mobility barriers. Range Of Motion therapy is very useful for strengthening weak muscles and preventing complications that arise from a lack of movement, such as contractures. This study aims to explain the application of ROM therapy in stroke patients with mobility impairments. The method used in this study is a literature review. A literature review was conducted using articles and journals from the Google Scholar database from 2021 to 2025. using keywords: muscle weakness, Range of motion, Elderly, stroke. The results of the case study showed that both respondents who experienced physical mobility problems showed increased strength after undergoing ROM therapy. In conclusion, Range of Motion (ROM) therapy can help improve muscle strength in patients affected by stroke. It is recommended that families always accompany the patient during therapy to provide necessary support and understand how to assist the client with range-of-motion exercises.

**Keywords:** Weakness of muscle strength, Range of Motion, Stroke.

## INTRODUCTION

Stroke is a sudden nervous system disorder that arises from problems with the brain's blood flow. This problem can be a blockage or rupture of blood vessels in the brain. Disruption of the supply of oxygen and nutrients to the brain can cause damage to nerve cells, causing stroke symptoms [1]. According to the World Health Organisation (WHO) data in 2015, stroke is ranked at the top as a cause of death worldwide. In that year, stroke was responsible for 31% of the total global deaths. The majority of deaths caused by stroke occur in countries with low and middle-income levels [2]. According to data from Riskesdas in 2018, the incidence of stroke in Indonesia shows an annual increasing trend. The prevalence was recorded at 10.9 per square mile of population, up from 7.0% in 2013. About 50.2% of stroke cases were recorded in individuals aged 75 years and above, and 32.4% in the age group of 55 years and above. Men have a slightly higher prevalence of stroke, at 11%, compared to women, who are 10.9%. In Gorontalo, the prevalence of stroke patients is reported to reach 10.9% [3].

The main nursing problems experienced by individuals who have had a stroke include physical mobility barriers. This condition is generally caused by impaired blood circulation. Therefore, once the patient's neurological and hemodynamic conditions have stabilised, mobilisation should be initiated immediately. Regular mobilisation can help prevent post-stroke complications, especially contractures. This exercise is designed to reduce dependence on others, improve self-esteem, and strengthen the patient's coping mechanisms after hospital treatment [4].

One nursing intervention for stroke patients is facilitating systematic mobilisation, or movement of the body, through Range of Motion (ROM) exercises. ROM is a series of muscle and joint exercises given to patients with reduced mobility due to illness, disability, or injury, either actively or passively. Passive ROM is performed with the patient assisted by a nurse in each training session. Providing ROM exercises to areas such as the wrists, elbows, shoulders, fingers, and other extremities affected by hemiparesis is crucial to prevent complications from immobilisation, such as contractures. The results of this study indicate that range-of-motion (ROM) exercises contribute to increased joint flexibility. [5]

## MATERIAL AND METHOD

This literature review collected relevant articles and journals from the Google Scholar database from 2021 to 2025. The search technique for this literature review began by identifying several keywords in the database to find relevant journals. The keywords used were muscle weakness, range of motion, elderly, and stroke [6]. Articles appearing in each database will be identified through their titles and abstracts. Appropriate titles and abstracts will then be identified again based on inclusion and exclusion criteria until the appropriate article is found. The data/article collection process will be reviewed using a matrix to organise and compare articles that meet the inclusion and exclusion criteria [7].

## RESULTS AND DISCUSSION

Stroke is one of the conditions that can cause disability. It is estimated that about one in three people affected by stroke worldwide has a permanent disability. The occurrence of a stroke is related to the inability of the brain's blood vessels to deliver oxygen to brain cells. Stroke symptoms generally appear suddenly, characterised by loss of strength on one side of the body, confusion, difficulty speaking

or understanding, vision problems, difficulty walking, headaches, and loss of balance [9]. Lifestyle changes such as irregular diet, lack of physical activity, excessive working hours, and increasingly consuming fast food have become common habits that can increase the risk of stroke. Stroke is a serious health problem that requires special attention. Patients who have suffered a stroke need a rehabilitation process to reduce the physical impact that may arise; This rehabilitation should be started as soon as possible in the right way to support faster and more effective physical recovery and avoid muscle weakness. To overcome muscle weakness, ROM (Range of Motion) exercises that are done slowly can help the healing process in patients [10].

Table 1. Research Results on the Application Of Range Of Motion (ROM) Therapy To Increase The Strength Of The Extremity Muscles In Patients With Stroke

| No. | Author Name | Year | Research results | Interventions Carried Out |
|---|---|---|---|---|
| 1 | Zahra Siti Hanifah, Siti Ulfah Rifa'atul Fitri, & Urip Rahayu (Universitas Padjadjaran) | 2024 | Both study subjects experienced an increase in muscle strength from scale 3 to scale 4 after ROM exercises. Shows ROM exercises improve muscle strength in stroke patients. | Passive ROM training for hemorrhagic stroke patients with hemiparesis sinistra for 4 days, twice a day at Sumedang Regency Hospital. |
| 2 | Rima Fitriani, Erni Forwaty, & Melly (Ministry of Health Polytechnic, Riau) | 2022 | After 4 days of ROM training, there was an increase in the strength of the sinistra extremity muscles by 25% (level 1) in hemorrhagic stroke patients. | Active and passive ROM exercises were given for 1 week (13–19 April 2022) to 2 stroke patients at the Rumbai Pekanbaru Health Center, each twice a day for 15–30 minutes. |
| 3 | Diana Maljuliani, Hasniatisari Harun, & Siti Ulfah Rifa'atul Fitri (Universitas Padjadjaran) | 2023 | Subject I experienced an increase in muscle strength from 5151 to 5352, and Subject II from 5151 to 5252. The difference in results was influenced by the patient's motivation and physical condition. | Active-passive ROM training accompanied by pharmacological therapy was carried out twice a day for 4 days (20-25 minutes) in hemorrhagic stroke patients with hemiparesis sinistra |

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|---|---|---|---|---|
| | | | | at Sumedang Regency Hospital. |
| 4 | Ns. Endro Haksara & Shafira Aliya Putri (Kesdam IV Nursing Academy/Diponegoro Semarang) | 2021 | | Passive ROM training in non-hemorrhagic stroke patients for 2 weeks (April 12-28, 2021), was carried out twice a day with family assistance. |

Bilateral passive ROM exercises were shown to be more effective at increasing muscle strength than unilateral passive ROM in patients with ischemic stroke (significant, $p < 0.05$). There was an increase in muscle strength after exercise in both groups ($p = 0.000$), and a significant difference showed that post-test results for the bilateral group were higher ($p = 0.024$). Therefore, ROM exercises should be prioritised to increase muscle strength in stroke patients, while still paying attention to the discharge plan and follow-up after the patient returns home [11].

Researchers have implemented ROM interventions in health facilities to address neurological problems and improve mobility in patients affected by stroke, with nurses carrying out the interventions. This suggests that ROM is carried out in hospitals as part of stroke management, but does not provide detailed information about the frequency or the researcher's experience [12].

ROM exercises for stroke patients in the hospital are recommended as part of therapy to increase muscle strength, noting that some patients may need to be referred for further control. ROM exercises can be performed twice a day for a few days (e.g., 5 days) to boost muscle strength. [13]

Muscle strength in post-stroke patients before and after the application of a range of motion exercises. Before ROM training, the lowest muscle strength score was 2, the highest was 4, and the average was 3.50. This happens because stroke survivors often experience complications such as partial body paralysis and functional disorders such as sensory movement difficulties. After the application of ROM, muscle strength increases: the minimum value is 2, the maximum is 5, and the average is 4.00. This shows an increase in muscle strength after the intervention [14]. The results of the application of a range of motion training (ROM) in post-stroke patients for 7 days showed an increase in muscle strength; The strength of the hand muscles from

1333/5555 increased to 2444/5555, while the strength of the leg muscles from 3333/5555 increased to 4444/5555 [15]. Range of motion (ROM) training is an activity that stimulates the movement of body parts to maintain joint flexibility and mobility. This exercise is performed on each part of the joint following normal movements, both passively and actively. ROMs, both active and passive, can be done at any time, but they must still be adjusted to the patient's condition [16].

The effectiveness of range of motion therapy can increase muscle strength in patients with muscle weakness, those in the physical rehabilitation phase, and those who lie down for extended periods. However, range-of-motion therapy cannot be performed in patients with joint or bone problems, those in the mobilisation stage due to heart problems, or those with joint infections [17].

## CONCLUSION

The use of a range-of-motion exercise program can strengthen muscles in patients who have had a stroke. Therefore, the authors concluded that range-of-motion therapy had a positive impact on muscle strengthening in patients with stroke after the intervention was carried out for 6 days in both respondents, with a frequency of twice a day and a duration of 15-20 minutes. Range-of-motion exercises should be performed as early as possible and on a regular basis to avoid complications, increase muscle strength and joint flexibility, and improve the quality of life of patients who have had a stroke [18].

In the discussion above, it is concluded that the researchers' results are similar: ROM can increase muscle strength in stroke patients. Aiming to find out the picture of the effect of ROM therapy on improving motor function in stroke patients. The results showed that before the intervention was given and after the intervention was given, there was a change in muscle strength. Respondents are encouraged to be more active in physical activity so that there is no muscle loss, one example is doing ROM.[19]

The suggestions from this literature review could serve as a starting and expandable basis for further research on the elements that affect the effectiveness of increased muscle strength in stroke patients. For this reason, nurses need to understand various factors that affect the effectiveness of increasing the strength of stroke patients through active and passive Range of motion (ROM) nursing measures. [20]

## AUTHORS' CONTRIBUTIONS

**Mutiara Hermawati**: Conceptualisation, Writing –reviewing & editing, Writing –original draft. **Sitti Johri Nasela** : Writing –review & editing, Methodology, Writing –original draft preparation. **Jois Nari**: Writing –review & editing, Methodology, Investigation. **Johana Tomasoa**: Writing –review & editing, Writing –original draft, Visualisation, Validation.

## DISCLOSURE STATEMENT

The authors declare that they have no financial conflicts of interest or personal relationships that could have influenced the results reported in this paper. The data were obtained from Google Scholar databases. The authors acknowledge that, although they have used these data for academic research purposes, they do not claim ownership of them. All authors contributed to the conception and design of the study, the collection of literature, and the analysis and interpretation of the results. The authors confirm that the manuscript has been read and approved by all named authors. The authors confirm that this manuscript is an original work that has not been published elsewhere and is not currently under consideration for publication.

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