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# Implementation Of Rubber Ball Grasp Exercises In Patients With Physical Mobility Impairment



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**Abstract**

**Background:** Nervous System Disorders are a disease that affects the entire nervous system, where this condition can affect neurons or tracts of the central nervous system in the spinal cord or the entire brain or cerebrum (cortex), cerebellum. In addition, conditions that affect the peripheral nervous system involve the cranial nerves or nuclei, spinal plexuses, peripheral nerves, nerve roots, autonomic nerves, neuromuscular junctions, and muscles, (World Health Organization). Based on Roy's adaptation theory that nerve function: Neurological connections are an integral part of a person's coping mechanism regulator. has a function to control and coordinate body movements, awareness and good cognitive emotional processes to regulate the activity of the body's organs. Application of rubber ball grip exercise techniques is to increase muscle strength in stroke patients

**Methods:** Case study design, with stroke patient subjects, observation sheet data collection instruments, standard operating procedures (SOP). in performing rubber ball grip exercises.

**Results:** Researchers showed that after implementing the ball grip exercise technique, there was an increase in muscle strength in stroke patients. Mr. Y was only able to do 2 cycles. Mrs. C was able to do ball grip exercise therapy actively and could do it independently with 5 cycles. proven in respondents 1 and 2 can increase muscle strength in Mrs. c muscle strength to 5 and Mr. Y muscle strength to 3

**Conclusions:** the application of rubber ball grip exercises to increase muscle strength and nursing function in the concept of Roy's adaptation is a neurological relationship is an integral part of a person's coping mechanism regulator. has a function to control and coordinate body movements, awareness and good cognitive emotional processes to regulate the activity of body organs the function of nurses to make patients independent after providing education or therapeutic actions recommended for patients with physical mobility disorders.

**Keywords:** Physical mobility impairment, roy's adaption, nursing theory, rubber ball grip exercises.

## Introduction

Nervous System Disorders are diseases that affect the entire nervous system. These conditions can affect neurons or central nervous system tracts in the spinal cord or the entire brain, including the cerebrum (cortex), and cerebellum. In addition, conditions affecting the peripheral nervous system involve the

cranial nerves or nuclei, plexuses, and nerves. spine, peripheral nerves, nerve roots, autonomic nerves, neuromuscular junctions, and muscles. Based on Roy's Adaptation model, humans are bio-psycho-social creatures that interact with a dynamic environment.

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In addition, the environment can also be described as all conditions, circumstances, and influences that affect development, as well as human behavior as an adaptive system, with special attention to human and natural resources (Jennings, 2017). The environment in Roy's Adaptation model is the circumstances and influences that surround the impact on the development and behavior of individuals or groups, both factors originating from internal and external factors, where factors include focal, contextual, and residual stimuli. (Roy & Andrews, 1999), Physiological functions are related to body structure and function. Roy identified nine basic physiological needs that must be met to maintain integrity, divided into two, namely, a basic level physiological function model consisting of 5 needs and physiological functions with a complex process consisting of 4 parts, namely nervous function: Neurological connections are an integral part of a person's coping mechanism regulator. Has a function to control and coordinate body movements, awareness and good cognitive emotional processes to regulate the activity of body organs.

World Health Organization (2018) stated in their data that a clinical syndrome can be characterized by symptoms of impaired brain function that can cause disability lasting more than 24 hours, for no reason other than vascular disorders. This study shows that the number of stroke cases continues to increase year after year in every age group, from young to old, in various developing countries, including Indonesia (Martati 2022). Data from the World Stroke Organization (2022) shows a 70% increase in stroke cases, a 43% increase in mortality, and a 143% increase in morbidity in low- and lower-middle-income countries (Feigin et al. 2022). Meanwhile, data from the 2018 Indonesian Basic Health Research (Riskesmas) states that 10.9% of the population aged 15 years and over in Indonesia experienced stroke, with the highest rate in West Java Province, which has a population of 1.2 million.

Meanwhile, in the city of Bogor, in 2020, there were 2,034 cases of stroke, and the city recorded the highest number of deaths due to non-communicable diseases, with 164 people. Furthermore, stroke cases also increased in 2019 to 1,026 cases of stroke patients. Based on the information obtained in this study, the achievement of stroke cases, for patients in the Mawar room of PMI Hospital in Bogor City showed a decline in the last three months, namely in February 2025 there were two patients recorded and in April there was one

patient recorded. Meanwhile, the number of stroke cases achieved in February and April 2025 reached 1.5% (150 patients), and during interviews with health workers (nurses) it was also found that in the Mawar room there was no application of rubber ball gripping exercises. This rubber ball gripping exercise also aims to stimulate hand motor skills, by gripping a rubber ball that has a flexible and serrated texture, so that the stimulation can restore muscle fibers so they can contract again, because with muscle contraction, it will improve the quality of the hand muscle nerves due to an increase in motor function (Azizah & Wahyuningsih, 2020)

**Methods**

This scientific paper uses a descriptive method in the form of a case study regarding the Application of Rubber Ball Grip Exercises in patients with physical mobility disorders. A case study is a research that includes analysis that aims to provide a detailed explanation of the context, nature, and characteristics contained in a case; in other words, a case study focuses on a case in depth and detail. In research, the method applied to a situation or condition is carried out systematically with steps starting from observation, data collection, information analysis, to reporting results. (Harahap, 2020). In the case study design with the application of rubber ball grip exercises on patients with physical mobility disorders carried out at the PMI Bogor Hospital with 2 respondents, the aim was to stimulate hand motor skills, by gripping a rubber ball that has a flexible and serrated texture, so that the stimulation can restore muscle fibers so they can contract again. This implementation was carried out for 3 days.

**Results**

**Table 1. Vital signs status before and after non-pharmacological therapy with the application of rubber ball grip exercises.**

Initial	Day	Blood Pressure (mmHg)	
		Pre	Post
Mrs. C	1	138/79	135/90
	2	125/81	130/74
	3	130/80	138/80
Mr. Y	1	130/80	138/95
	2	120/70	130/89
	3	125/80	130/80

Based on the blood pressure examination on the first day of application, Mrs. C before 137/79 mmHg after application was 135/90 mmHg, while Mr. Y's blood pressure was measured with the results of 130/80 mmHg after application was 138/95 mmHg.

**Table 2. Muscle strength levels before and after exercise therapy using rubber balls for patients with physical mobility disorders**





Initial	Day	Muscle strength levels	
		Pre	Post
Mrs. C	1	3	3
	2	3	4
	3	4	5
Mr. Y	1	2	2
	2	3	3
	3	3	3

After applying the rubber ball grip exercise to 2 respondents, it was possible to increase muscle strength to overcome physical mobility disorders well in respondents I and II because by applying rubber ball grip therapy for 3 days it was possible to increase muscle strength slowly.

**Table 3. blood pressure examination on the first day of Muscle Strength Cycle**

Initial	Implementation Cycle		
	Day 1	Day 2	Day 3
Mrs. C	4 Cycles	4 Cycles	5 Cycles
Mr. Y	1 Cycles	2 Cycles	2 Cycles

increase in the value of Mrs. C's muscle strength scale before the ball grip exercise with muscle strength 3 and during 3 days of application to 4 and 5 with the first day cycle of 4 cycles, then the second day 4 and the third day increased to 5 cycles, increase in the value of muscle strength in Mr. Y before the ball grip exercise with muscle strength 2 and during 3 days of application to 3 with the first day cycle of 1, then the second day 2 and the third day increased to 2 cycles of this application assisted by the researcher.

**Discussion**

Mrs. C and Mr. Y with a nursing diagnosis regarding physical mobility disorders related to decreased muscle strength (D.0054) with 2 respondents. The purpose of this discussion is to analyze and combine the results obtained in the case study with the underlying theory, as well as answer the problems that have been formulated, the results showed that both experienced an increase in muscle strength, before being carried out, Mrs. C's muscle strength value was 3 to 5 and in Mr. Y's muscle strength value was 2 to 3, that in the study there was an increase in muscle. This research is in line with the study conducted by Dian Mareta Sari et al (2023) This exercise can be done once a day with 15 grips to strengthen muscles in dealing with physical mobility problems, this support was also found in the study of Margianti (2022) was stated that ball grip, exercises in stroke patients showed an increase in muscle strength after 4 days. serrated rubber ball grip exercises are able to stimulate the nerves that

have decreased so that they can trigger stronger muscle movements.

Furthermore, Ambika Anggardani et al (2023) state if one type of muscle weakness experienced by stroke patients is weakness in the hand muscles in stroke patients. This is caused by damage to the Brodmann area 4-6 which is the motor center, which results in the absence of impulses being sent to the fingers. This research is in line with Roy's Adaptation Theory Concept, if a patient can adapt to his/her illness in changing health improvement then he/she can cope independently. This intervention aims to increase muscle strength, improve muscle tone and tendon reflexes that are experiencing weakness, stimulate motor nerves in the hands so that atrophy does not occur, therapy that will be transmitted to the brain. The nurse's task is to make the patient independent after providing education or therapeutic actions recommended for patients with physical mobility disorders.

**Limitations**

The limitations of this case study discuss the application of rubber ball grip exercises to patients with physical mobility disorders, the limitations are that the patient's limitations were found because the application was only carried out once at the PMI Bogor Hospital. I continued the next application with a home visit with the same complaint of non-hemorrhagic stroke, upper extremity weakness. When applying to Mr. Y, he was only able to do 2 cycles. Mrs. C was able to do ball grip exercise therapy actively, which could be done independently with 5 cycles in a span of 5-10 minutes, which should be done according to theory 5-7 times/day, done gradually for 3 days. During the implementation of therapy to 1 patient, Mr. Y had difficulty moving his right extremity due to stiffness in his fist, doing rubber ball grip exercise therapy with assistance.

**Conclusion**

After conducting a case discussion, by comparing the theory and cases on patients in the practice field through nursing actions applied to patients Mrs. C and Mr. Y with a diagnosis of physical mobility disorders in the Mawar Room of PMI Hospital, Bogor, the results of the research and discussion were obtained which can be concluded as follows:





The application of non-pharmacological nursing actions in the form of rubber ball grip exercises in patients with impaired physical mobility was applied for 3 consecutive days. The results of the application of non-pharmacological nursing actions in the form of rubber ball grip exercises in patients with impaired physical mobility, In the rose room for 3 days, Mrs. C was found with muscle strength before the application of 3 and after 5, Mr. Y was found with muscle strength before the application of 2 and after 3. There was an increase in muscle strength due to the application of rubber ball grip exercises, as evidenced by the results of the application of this increase in exercise which can help increase motor nerve stimulus.

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