

## Section: General Nursing

### Shaker exercise to manage swallowing disorder in patient with stroke experiencing dysphagia

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#### Abstract

This case study evaluates the clinical application of Shaker exercises to treat dysphagia and impaired swallowing function in a post-stroke patient. Baseline assessment using the 13-domain NANDA-I framework identified a nursing diagnosis of impaired swallowing secondary to cerebrovascular dysfunction, clinically manifested by difficulty swallowing, weak deglutition musculature, and secondary refusal to eat. To evaluate baseline function and progress, a standard Water Swallow Test (WST) using boiled water was conducted. As a non-pharmacological nursing intervention, the patient performed Shaker exercises twice daily over a five-day therapeutic period. Longitudinal evaluation via the WST demonstrated progressive clinical improvement: initial testing on days one and two remained abnormal; by day three, functional gains were evident despite transient post-swallow coughing; and by days four and five, the patient achieved normal swallowing function with a completely normal WST result. Ultimately, five consecutive days of targeted head-lift exercises resulted in the complete resolution of the swallowing disorder, evidenced by enhanced suprahyoid muscle strength, improved nutritional intake, and normal deglutition mechanics. At post-therapy evaluation, the patient demonstrated seamless swallowing without difficulty, absence of coughing during or after fluid ingestion, stable vocal quality, and no clinical signs of airway compromise or aspiration. These findings highlight Shaker exercises as an effective, autonomous nursing intervention that improves swallowing recovery and reduces aspiration risks in stroke patients presenting with neuropathic dysphagia.

**Keywords:** Dysphagia, exercise, nursing care, stroke, swallowing disorder

#### Introduction

Stroke is a rapidly developing brain dysfunction caused by blood vessel damage, which can lead to death or permanent disability if it lasts more than 24 hours (Kuriakose & Xiao, 2020). Stroke is the sudden loss of brain function due to disruption of the blood supply to part of the brain (Gasull & Arboix, 2022). Risk factors for stroke include advanced age (over 55 years), male gender, and hypertension, obesity, and diabetes mellitus (Rehman et al., 2024). Complications that can occur from stroke include impaired motor, sensory, and cognitive function, as well as dysphagia. Dysphagia is a sensation experienced by patients experiencing difficulty swallowing. Dysphagia in stroke patients occurs due to neurological disorders, which weaken the swallowing muscles. Dysphagia occurs in 36% to 67% of stroke patients. Dysphagia can increase the risk of aspiration, pneumonia, and malnutrition, which can worsen the patient's condition and increase the risk of death due to dysphagia. One of the nursing problems that often occurs in stroke patients with dysphagia is swallowing difficulties due to cerebrovascular disorders. Therefore, dysphagia management is crucial to address swallowing difficulties. According to the Global Burden of Disease (GBD) (2021), stroke is the third leading cause of death, with an annual incidence of 141.55 deaths globally, or 95%, per 1,000 people. According to the Indonesian Health Survey (SKI 2023), the stroke incidence in Indonesia was recorded at 8.3 per 1,000 people. According to the Central Java Health Profile (2023), stroke is one of the consequences of three major non-communicable diseases in Indonesia: hypertension, obesity, and diabetes mellitus, if not properly managed.

Dysphagia management in stroke patients involves a thorough assessment and appropriate intervention. A key approach to addressing nutritional deficits due to dysphagia is training the neck muscles, which contribute to improved swallowing function. One proven intervention for dysphagia is shaker exercises. Shaker exercises are a complementary therapy that nurses can perform independently. Shaker exercises are a rehabilitation technique aimed at strengthening neck muscles and improving swallowing function. Shaker exercises work by increasing the strength of the suprahyoid muscle, which plays a role in opening the upper oesophageal sphincter, thus facilitating a more efficient swallowing process (Lulu & Koto, 2023). Research demonstrated that shaker exercises performed in an intervention group improved the swallowing ability of stroke patients with dysphagia (Tuomi et al., 2022). Furthermore, a literature review on the effectiveness of shaker exercises, and the results showed that shaker exercises can improve changes in neck muscle performance for swallowing, nutritional status, and reduce the risk of aspiration in stroke patients with dysphagia. A study conducted to determine the effectiveness of shaker exercises on swallowing function

showed that shaker exercises were effective in improving swallowing function in patients with post-stroke dysphagia. A study aimed at investigating the effects of shaker exercises on stroke patients with dysphagia. The results showed that shaker exercises can reduce the severity of swallowing dysfunction and aspiration. A preliminary study was conducted at the hospital. Of the 134 patients treated between January and December 2024, 80 stroke patients, 60% of whom experienced dysphagia. Of these patients, 100% had nursing problems related to swallowing disorders. Therefore, this case study was conducted to illustrate the application of the Shaker exercise to stroke patients experiencing dysphagia and swallowing disorders.

### **Case Description**

This case study was conducted for 7 days in October 2024, on 1 male patient aged 56 years, with a medical diagnosis of Dysphagia and Stroke. The patient was assessed starting on October 28, 2024. The results of the assessment were obtained: the patient said it was difficult to swallow, the patient refused to eat, sometimes coughed after eating or drinking, and the swallowing muscles were weak. The results of the Water Swallowing Test (WST) examination showed: the patient coughed when drinking 2 sips, the patient coughed after drinking the drink, there was no change in voice, no hoarseness and the patient finished 50 ml of water in 3 sips, stopped because of coughing, and continued to finish 50 ml of water in 3 sips. From the results of the assessment, a nursing problem was formulated Swallowing disorders related to cerebrovascular disorders. Interventions were arranged with the aim, after treatment for 3x24 hours, swallowing disorders were resolved with the following outcome criteria: the patient was able to swallow, the patient wanted to eat, did not cough after eating or drinking, and the swallowing muscles improved. The defined action plan includes self-care support for eating and drinking, aspiration prevention, adherence to treatment, emotional support, and teaching shaker exercises as an innovative therapy based on evidence-based practice. Implementation was carried out over 3 days, including support for eating and drinking, aspiration prevention, and shaker exercise therapy. The innovation implemented was shaker exercises. The intervention in this case study was evidence-based and can ultimately be used as a reference source for nursing interventions in patients with dysphagia due to stroke and swallowing problems. This shaker exercise intervention was carried out twice daily for 5 days. Monitoring of the patient's swallowing ability was carried out with a water swallowing test (WST) after each shaker exercise. This test was given to the patient 100 ml of water and asked to drink it all. The WST was carried out by monitoring four things: whether the patient coughed while drinking, whether the patient coughed after drinking, whether the patient had a hoarse voice after drinking, and the speed of swallowing.

### **Discussion**

The case study found that the patient had swallowing problems, and a nursing diagnosis of swallowing disorders related to cerebrovascular disorders was formulated, as evidenced by the patient's difficulty swallowing, refusal to eat, occasional coughing after eating or drinking, and weak swallowing muscles. Palpation of the neck muscles revealed vertical laryngeal movement, and the Water Swallowing Test (WST) revealed coughing during and after drinking. The interventions prescribed for the patient's swallowing disorder included support with eating and drinking, as well as aspiration prevention. An innovative intervention, shaker exercises, was also implemented. Implementation was then carried out based on objectives and outcome criteria, for 3 x 24 hours, in accordance with the predetermined action plan, to address swallowing disorders. Shaker exercises, as an innovative therapy for addressing swallowing disorders, were also implemented for 5 days, with a frequency of 2 times daily. Observations of the patient's swallowing ability after the shaker exercise therapy were also conducted, by observing the results of the water swallow test. The results showed that on the fourth and fifth days the patient was able to swallow well, as evidenced by a normal WST test. The patient did not cough while drinking, did not cough after drinking, there was no change in voice or hoarseness, and the patient was able to consume 100 ml of water in 4 gulps. Evaluation after implementation showed that the swallowing disorder was resolved.

Swallowing disorders, or dysphagia, in stroke patients occur through three mechanisms. The first is impaired coordination of the swallowing muscles. Damage to the motor cortex or brainstem can disrupt coordination between the muscles of the pharynx, larynx, and esophagus. The second mechanism is decreased pharyngeal sensitivity. Stroke can damage sensory pathways, preventing patients from sensing food or liquids in the throat, increasing the risk of aspiration. The third mechanism is muscle weakness. Stroke can cause hemiparesis, or paralysis of the muscles involved in swallowing, especially in strokes affecting the brainstem. Stroke also damages the part of the brain that controls swallowing, disrupting coordination of the muscles involved, leading to nursing problems related to swallowing disorders (Dziewas et al., 2021). Nursing care provided to the patient, particularly in the implementation of shaker exercises, found that the patient's swallowing disorder improved after the implementation of shaker exercises on the third day, and the patient's swallowing function further improved on the fifth day. This proves that shaker exercises are successful in overcoming the patient's swallowing disorder. Shaker exercises can overcome dysphagia through two mechanisms: isometric and isotonic. In the isometric mechanism, with the patient lying on their back and lifting their head to look at their toes, holding the position for 30-60 seconds, it will increase the endurance of the suprahyoid muscle, which is responsible for the elevation of the larynx and the opening of the esophagus. In the isotonic mechanism, with the patient raising and lowering their head 30 times without holding the position, it can

increase the contraction and relaxation of the suprahyoid muscle, thereby increasing the flexibility of the esophagus and facilitating the movement of the food bolus. Shaker exercises help address nutritional issues in patients with dysphagia. Shaker exercises activate the suprahyoid muscles in the gastric, geniohyoid, and mylohyoid muscles, which stimulate contraction of the thyrohyoid muscle to open the UES efficiently. This increases the upward and forward movement of the larynx, which is crucial for assisting swallowing, thus improving swallowing function in patients with dysphagia (Lulu & Koto, 2023).

A study conducted found that shaker exercises for treating dysphagia focused on strengthening the anterior neck muscles that control the pharyngeal phase of swallowing (Logemann et al., 2009). This improved suprahyoid muscle function, which supports the opening of the upper oesophageal sphincter and reduces aspiration, resulting in significant improvements in swallowing function in stroke patients with dysphagia. Lulu also conducted a study on the effectiveness of shaker exercises in patients with post-stroke dysphagia. The results show that shaker exercise helps improve swallowing ability and prevents aspiration, by stimulating suprahyoid muscle activation, increasing anterior and superior laryngeal movement, and contributing to the opening of the upper oesophageal sphincter (Tuomi et al., 2022). Research demonstrated that shaker exercises can improve swallowing ability in dysphagia patients, particularly post-stroke patients. Shaker exercises stimulate pharyngeal receptors in the anterior arch, which helps restore normal swallowing physiology (Steele, 2012). This triggers the swallowing reflex and improves neuromuscular coordination. Furthermore, shaker exercises strengthen swallowing muscles, such as the suprahyoid muscle, and can shorten the thyrohyoid muscle, which helps facilitate more efficient swallowing (Coi et al., 2017). Furthermore, shaker exercises facilitate the upper oesophageal sphincter by increasing the strength of the hyoid or laryngeal muscles, allowing food to pass more smoothly into the oesophagus.

The above discussion concludes that Shaker Exercise can increase the strength of the swallowing muscles, improve neuromotor coordination, and facilitate the opening of the UES, all of which support the recovery of swallowing function in patients with dysphagia, ultimately significantly assisting in addressing nutritional deficits. Nurses, as direct care providers, can potentially implement Shaker Exercise to address swallowing disorders in patients with stroke-related dysphagia. This therapy can be performed independently by nurses and its effectiveness has been proven based on evidence.

## Conclusion

A case study conducted by providing nursing care to a patient with dysphagia-induced swallowing problems due to stroke. By applying shaker exercise therapy to overcome swallowing problems, it was found that the patient's problem was resolved. After doing shaker exercises twice a day for 5 days, and conducting a water swallowing test after therapy, the patient's swallowing problems were resolved. The patient could swallow without difficulty, did not cough during and after swallowing, there were no changes in voice and no signs of aspiration. This is because shaker exercise has been proven to improve the performance of swallowing muscle strength, can improve neuromotor coordination, and can facilitate the opening of the UES, which overall supports the recovery of swallowing function in patients with dysphagia, so that ultimately it is very supportive in overcoming swallowing problems.

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