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## THE EFFECTIVENESS OF CODMAN PENDULUM EXERCISE AND SCAPULAR MOBILIZATION TO REDUCE PAIN IN FROZEN SHOULDER CONDITIONS

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### Abstract

Frozen shoulder is an idiopathic condition of the shoulder characterized by the onset of pain and limitation in the shoulder joint. Frozen shoulder is more common in women than men and occurs in the age range of 40 to 65 years. Problems that arise due to frozen shoulder can be given intervention or Codman Pendular exercise and scapular mobilization techniques. The purpose of this study is aimed at frozen shoulder sufferers to reduce pain. The exercises given in this frozen shoulder condition are Codman pendular exercise and Scapular Mobilization. This research method is a mental experimental study with pre and post test group design by comparing the level of previous and subsequent pain measured with visual measuring instruments analoge scale (VAS), against the provision of codman pendular exercise and scapular mobilization in frozen shoulder conditions for 4 weeks. Results: Analysis of pain loss difference test with visual analoge scale (vas) in the sample group with a significant value of  $p = 0.0001$  which shows a  $< 0.05$  which means there is an effect on the effectiveness of exercise administration Codman Pendular Exercise and Scapular Mobilization in reducing frozen shoulder pain.

**Keywords:** frozen shoulder; codman pendular exercise; scapular mobilization; visual analoge scale

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### INTRODUCTION

Frozen shoulder or adhesive capsulitis occurs in 2% to 5% of the population, and usually occurs in 40% of people with diabetes mellitus. Frozen shoulder is more common in women than men, and occurs in the age range of 40 to 60 years (Boruah et al., 2015). According to the Ministry of Health of the

Republic of Indonesia in 2005, about 40.5% of workers in Indonesia have complaints of work-related health problems, including disorders of the shoulder joint by 16% (Lumunon et al, 2015).

Frozen shoulder causes the capsule that wraps around the shoulder joint to shorten and constrict and scar tissue forms. This causes pain and stiffness in the shoulder joint, so over time the shoulder becomes difficult to move. There are two frozen shoulder syndromes, namely primary syndrome and secondary syndrome. In primary or idiopathic syndrome, frozen shoulder that occurs spontaneously or directly without knowing the causative factors (Ihsan et al., 2022). Primary syndrome occurs due to a chronic inflammatory response with fibroblast proliferation which can actually be a response from an abnormal immune system (Okilanda et al., 2021). Secondary syndromes occur due to several triggers such as, trauma that can cause shoulder injuries or surgery associated with the onset of other conditions such as diabetes mellitus, rotator cuff injuries, autoimmune diseases and cardiovascular disorders (Boruah et al. , 2015).

Frozen shoulder consists of, 3 phases, namely: the freezing (painful phase) will end in 2-9 months. The frozen (stiff phase) will end in 4-12 months, and the thawing (recovery phase) will end in 5-24 months (Chan et al. , 2017). Pendular Codman exercises are an intervention often used by physiotherapists to reduce pain and improve ROM in frozen shoulder conditions. Giving a codman pendulum is a technique introduced by codman, in the form of arm swing movements with a bent body position (stopping). And the self-mobilization technique (self mobilization) that utilizes the influence of gravity to produce the effect of os pull. Humeri of the Fossa glenoidalis.

Scapular mobilisation is a treatment technique used for the management of shoulder musculoskeletal disorders. Manual application with therapist-controlled mobilization of the four directions of the scapula glide to the scapulothoracic joint. Scapular mobilization aims to mobilize joints or distractions, thus providing scapulothoracal distance and muscles will be extended. By controlling movement

from the position of the scapula can help the glenoid in its normal position (Martin; Kessler, 2016).

Based on the existing background in frozen shoulder conditions, efforts that can be made include: by increasing (promotive), prevention (preventive), healing (curative) and recovery (rehabilitative). Physiotherapy techniques, in addition to using physiotherapy modalities, can also be done manual therapy techniques such as exercises in frozen shoulder conditions. Researchers tried to perform Codman Pendular Exercise and Scapular Mobilization for pain reduction using a visual analogue scale in frozen shoulder conditions.

#### METHOD

This research design uses One Group pre and post test group design Experiment which aims to determine the effect of Codman Pendulum Exercise and Scapular Mobilization in reducing pain in frozen shoulder conditions. This research was conducted at the Fit Sport Clinic and Rehabilitation center in Pekanbaru City. The approach method in this study uses pre-test and post-test designs to determine how much codman pendular exercise and scapular mobilization affect the significant decrease in the condition of frozen shoulder (Putra et al) al., 2020). The data obtained using the ANOVA SPSS Version 25 method. The sample criteria used are patients who experience pain in the shoulder, do not experience fractures in the shoulder area and surgery on the shoulder. The number of samples in this study was 20 people who experienced shoulder pain due to frozen shoulder. The stages of research carried out are:

- a. Sample Collection and explanation to the sample related to the research to be carried out, if the sample is willing then the sample will fill in the inform en conset.
- b. Pretest using a pain measuring device that uses a visual analogue scale before the intervention / exercise
- c. Sample was given intervention for 4 weeks with meetings 3 times in 1 week

- d. Then a post test was carried out by measuring the level of pain again using a visual analogue scale (vas) at the first meeting of the intervention and the last intervention.
- e. After the data is obtained, the data is analyzed through anova

## RESULTS

Before being given Codman Pendular Exercise and Scapular Mobilization Exercise in the method using the initial test (pretest) and after that given a final test (post test) measuring pain in the shoulder joint frozen conditions shoulder by using visual analogue scale (VAS). In the initial test and final test of 20 samples obtained a significant value of  $p = 0.0001$  with a significance level of 0.005, which means that there is an effect on the effectiveness of pain reduction on the condition frozen shoulder with intervention or codman pendular exercise and scapular mobilization.

Table 1. One-Sample Test

	t	Df	Sig. (2-tailed)	Mean Difference	Test Value = 0	95% Confidence Interval of the Difference	
						Lower	Upper
Posttest	24.978	19	.000	6.750		6.18	7.32

## DISCUSSION

Codman Pendular Exercise is able to extend soft tissue structures such as muscles and tendons so that the flexibility of these tissues can be maintained so that there is an increase in the scope of motion of the shoulder joint and will automatically increase functional activity and decrease pain. Scapula mobilization with angular abduction movements of the glenohumeral joint performed consistently and of sufficient duration, increases the extensibility of contractile and non-contractile tissues of the scapula region and glenohumeral joint region. Thus improving reverse scapulohumeral rhythm and increasing elevation and abduction movements of the glenohumeral joint (Arisman et al., 2021). Increased exorotation of the glenohumeral joint as well as abduction and elevation movements of the shoulder joint will affect the increase in optimal functional activity in patients with frozen shoulder

Scapular mobilization is intended to mobilize the joint or distraction so as to provide scapulothoracic distance and the muscle will be extended. By controlling movement from the position of the scapula which can help glenoid in normal position. So that the movement will be more mobile and improve functional on the shoulders such as: lifting items, throwing, placing objects from a low position to a higher position and rubbing the back. Duzqun et al., (2019) stated that scapular mobilization has an effect as soon as I've so as to reduce muscle tension and increase joint mobility. The purpose of this scapular mobilization is to release tissue adhesions and relax the muscles around the shoulder so that it can improve movement in the shoulder (Arisman & Agun Guntara, 2021). The sedative effect caused will increase circulation so that metabolism increases, irritation decreases and can cause reduced pain and increased joint scope of motion.

Scapular intervention causes relaxation of antagonistic muscles and stability in the trained agonist muscles, when repeated administration with or without elastic rubber by concentric contraction or exentery, this exercise stimulates rhythmic muscle contraction so that dynamic stability is formed in the muscles trained. The stretching that occurs will attack the Golgi tendon organ (GTO) so that there is a voluntary reflex x sasi, contraction and intermittent stretching will improve capillary microcirculation and joint fluid by pumping action so as to reduce irritation of the afferent nerve which causes reflex balance muscle tone. The balance of this muscle tone will then provide correction to the scapular position when stationary or when moving still, so that a porsional scapular humerall rhythm movement is formed and avoids movements that can cause repeated injuries Improvement of scapular position and normal motion against the scapulathoracic, Then it will affect the normal motion of the scapulohumeral rhythm. Scapular mobilization is given 2 sets of 10 beats with a rest period of 30 seconds between 4 sets in a week for 4 weeks.

The results of this study were conducted on frozen shoulder pain conditions with a sample of 20 people who were given Codman Pendular Exercise and Scapular Mobilization intervention. One Sample t-test results were obtained with



a statistical value of  $p < 0.0001$  where  $p < 0.05$ , so it can be concluded that the intervention of Codman Pendular Exercise and Scapular Mobilization can reduce shoulder pain in frozen shoulder conditions .

### CONCLUSION

Based on the analysis of research that has been done and the discussion can be concluded, that the application of Codman Pendular Exercise and Scapular Mobilization interventions can reduce shoulder pain in frozen shouler conditions. With a frequency of 3 times a week for 4 weeks, intervention is carried out. Influence on changes in pain reduction values in research samples.

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