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DECREASE FUNCTIONAL MOVEMENT OF THE HAND IN DAILY LIFE IN GALEAZZI FRACTURES : CASE REPORT

Fita Martina[1] Taufik Eko Susilo[2]

Physiotherapy Department, Faculty of Health Science, Universitas Muhammadiyah Surakarta

*Corresponding author: Fita Martina, Email: fitamartina10@gmail.com

Abstract

Introduction : The Galeazzi dislocation fracture is a unique injury that involves a fracture of the radial diaphysis, together with a dislocation of the distal radioulnar joint (DRUJ). Galeazzi fractures have poor stability due to disruption of the DRUJ (distal radial ulnar joint) and disruption of the interosseous membrane (IOM), the triangular fibrocartilage complex (TFCC) which acts as the main stabilizer of the DRUJ and the dorsal and volar radioulnar ligaments.

Case Presentation : A 58-year-old patient had a chief complaint of limited movement in dorsi flexion and palmar flexion of the left wrist.

Management and Outcome : In this case, significant changes were found in muscle strength, and an increase in wrist ROM, but no change in functional ability was evident.

Discussion : Early mobilization has been shown to maintain physiological viscoelasticity and connective tissue homeostasis. Early movement up to 1-3 weeks after injury appears to significantly improve bone healing at the site of long bone fracture. Controlled movement is essential to avoid unwanted changes resulting from immobilization and to maintain normal homeostasis and connective tissue viscoelasticity.

Conclusion : The role of physiotherapy can reduce the adverse effects of immobilization and help the patient return to pre-fracture function. Physiotherapy management post Galeazzi fracture for 4 times intervention with evaluation done once a week 2 times to see the development of joint range of motion and functional activity in the left wrist, was not seen significantly.

Keyword : Fracture Galeazzi, Physiotherapy Management, Strengthening Exercise

Introduction

Galeazzi fractures account for 3-7% of all forearm fractures. It is usually more common in adults than in children [1]. Radia ulna dislocation fractures commonly occur in the mid-axis, occurring in about 1 to 10 per 10,000 people per year. In children it usually occurs at the age of 9 to 12 years. Many risk factors occur in sports (football and wrestling), osteoporosis, and post-menopause. This risk factor is most common in young men (10: 10,000) and elderly women (5: 10,000) [2].

The Galeazzi dislocation fracture is a unique injury that involves a fracture of the radial diaphysis, together with a dislocation of the distal radioulnar joint (DRUJ). The Galeazzi fracture is thought to be the result of a fall that causes an axial load to be placed on the hyperpronated forearm. Galeazzi fractures have poor stability due to disruption of the DRUJ (distal radial ulnar joint) and disruption of the interosseous membrane (IOM), triangular fibrocartilage complex (TFCC) which acts as the main stabilizer of the DRUJ and the dorsal and volar radioulnar ligaments. The IOM has a complex sheet of connective tissue that prevents translation of the radius of the ulna, and transmits axial and rotational forces [1]. DRUJ instability can be associated with multiple clinical complaints such as wrist pain and limited pronation-supination or tenderness. While pronation-supination disorders can occur due to pathology along the forearm axis [3].

With advances in surgical techniques to achieve osteosynthesis and soft tissue reconstruction, open reduction and internal fixation (ORIF) has become the standard of care for optimizing outcomes after forearm fractures associated with DRUJ disorders. Surgical management has yielded satisfactory results in more than 80% of adult patients with this injury [4].

Rehabilitation provides important benefits for functional repair after fracture, this process is associated with pain, decreased mobility, discomfort and long recovery time. Manual therapy is one of the applications of physiotherapy used in fracture rehabilitation, especially when using joint mobilization techniques to increase joint range of motion (ROM) and reduce pain [5]. Therapists often prescribe exercises after an upper extremity fracture to help a person return to pre-injury functional ability. Exercise is a structured physical activity carried out with the aim of increasing muscle strength and joint range of motion [6].

Case presentation

A 58-year-old woman, Nusukan Surakarta. The patient had a chief complaint of limitation of motion in dorsi flexion and palmar flexion of the left wrist. On February 16, 2021, he slipped and slipped in the kitchen of his house with his hands holding the support forward, 2 days later the patient came to the RSO and an MRI was performed. Plate and screw surgery and k-wire installation were performed on February 20, 2021. Information from the patient after the operation the patient wore braces for 2 weeks and wore arm slings for 1.5 months. During the use of the arm sling and the patient still has pain, the patient is reluctant to move his wrist and there is limited movement in dorsi and palmar flexion of the wrist on the left side. After 3 months postoperatively the patient was no longer complaining of pain, only limited movement.

Local examination of the left forearm revealed a marked deformity with minimal tenderness on palpation. Range of motion examination of the wrist was painless and showed 30° flexion-extension and 60° pronosupination. The left elbow, metacarpophalangeal, proximal, and distal interphalangeal joints exhibit full range of motion without pain. The end feel that can be obtained is the springy end feel in the dorsi flexion movement.

Examination of muscle strength using the Manual Muscle Test (MMT) on the left wrist 3. The MRI shown in the picture shows a fracture in the radius and dislocation, a disturbed DRUJ on the left distal arm.

Figure 1. MRI of the left forearm

Functional examination using the Patient Related Wrist Examination (PRWE) index rated their wrist pain and functional level from 0 to 10, and consisted of 2 subscales: Pain subscale: contains 5 items each rated further from 1-10 Functional contains 10 items which are further divided into 2 parts, namely special activities (having 6 items) and ordinary activities (having 4 items).

The functional ability of the patient on the PRWE index has no pain, namely a score of 50, and for the functional ability of specific activities with a score of 40 and special activities with a score of 40. The intervention plan given to the patient is aimed at increasing the range of joint motion so as to reduce limitations and increase strength. muscles in order to increase the patient's functional activity. intervention given ROM exercise to increase the limitation of motion. Do not forget to also give stretching to the muscles that have spasms. Exercises aimed at strengthening muscles are given and this exercise can be used as a home program for patients to do at home. The exercises provided can include: Grip strengthener, wrist extension, wrist flexion, wrist ulnar deviation, wrist radial deviation.

Provided education to do the exercises that have been taught to be done at home every day when there is free time, it is recommended to reduce activities that avoid movements that can worsen the condition, should not lift weights that are too heavy.

Outcome	T1 7 May 2021	T2 11 May2021	T3 18 May2021	T4 21 May 2021
ROM	S= 15º- 0 – 30 º F= 15º– 0 – 20º	S= 15º- 0 – 30 º F= 15º– 0 – 20º	S= 20º- 0 – 35 º F= 20º– 0 – 25º	S= 25º- 0 – 35 º F= 20º– 0 – 25º
MMT	3	3	4	4
Index fungsional	Pain : 50 / 50 Specific : 30/ 60 Khusus : 30/40	Pain : 50/50 Specific : 30/60 Khusus : 40/40	Pain : 50/50 Specific : 40/60 Khusus :40/60	Pain : 50/50 Specific : 40/60 Khusus : 40/40

Discussion

In this case, significant changes were found in muscle strength, and an increase in wrist ROM, but no change in functional ability was evident.

The role of physiotherapy can reduce the adverse effects of immobilization and help the patient return to pre-fracture function [7]. Previous studies have shown that giving active joint mobilization in post distal radius fractures with ORIF can promote better hand function, lower pain intensity, greater wrist and forearm ROM, higher grip strength, and lower disability rates. lower [5]. Early mobilization has been shown to maintain physiological viscoelasticity and connective tissue homeostasis. Early movement up to 1-3 weeks after injury appears to significantly improve bone healing at the site of long bone fracture. Controlled movement is essential to avoid unwanted changes resulting from immobilization and to maintain normal homeostasis and connective tissue viscoelasticity [8].

Active mobilization can produce a mechanism of hypoalgesia by stimulating endogenous pain modulation, which will allow the patient to move better and more frequently. Either through pain modulating mechanisms or through other means, being able to move better with less pain is likely to reduce the negative psychological manifestations of fractured injuries and subsequent immobilization, thereby encouraging patients to engage in rehabilitation exercises [9].

Stretching is an important component of physiotherapy in joint stiffness, the benefit of stretching is to increase the ability of connective tissue to respond to tensile loads due to the elastic properties of the tissue [7]. Passive stretching will lengthen the parallel muscle fibers, the addition of isometric contraction will place a load on the muscle fibers to produce more viscoelastic or plastic changes than is achieved by passive stretching alone. Active muscle contractions have been shown to have neuro-physiological effects, including pain inhibition, thus allowing the muscles to be stretched further [10].

Decreased muscle strength after fracture results in a decrease in the patient's grasping ability, this is related to pain that inhibits movement during muscle contraction [11]. After trauma, there is an expansion of the irradiated zone of nerve impulses and results in an increased reflex response of the muscles around the joint, which consists of higher tone and spasticity. At the same time the muscle strength is reduced to a complete blockage due to the pain and the presence of edema. Edema, hematoma, muscle imbalance, muscle rigidity, and protective

muscle reflexes are the major complications after elbow fracture and immobilization. Because of these complications, physiotherapy is given to increase joint flexibility, increase muscle strength and reduce pain to allow the upper extremities to perform activities of daily living independently [12].

Conclusion

Physiotherapy management post Galeazzi fracture for 4 interventions with evaluations done once a week 2 times to see the development of joint range of motion and functional activity on the left wrist, there is an increase in muscle strength, and scope of motion alone but for functional activities on the wrist there has not been any progress significantly.

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