Case Study: The Application of Extracorporeal Shockwave Therapy (ESWT) and Active Finger Blocking Exercise on Movement and Function of Fingers Disorders Caused by Trigger the 4th Finger Dextra

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ABSTRACT

Background: Trigger finger also referred to as stenosing tenosynovitis. It is a traumatic condition that involves the formation of nodules in the tendons of flexor digitorum muscle due to a combination of repetitive finger movements or local trauma and impaired healing, as a result of which the affected finger is locked in either a flexed or extended position thereby impeding movement. Objective: This case study was aimed to determine the effect of extracorporeal shockwave therapy, and active finger blocking exercise in one women patient, aged 47 years old with diagnosed of trigger the 4th finger dextra. Methods: This case studies have been carried out 6 times for 2 weeks in one women patient, by evaluating the degree of pain by using the Visual Analogue Scale (VAS), Joint Range of Motion (RoM) by using a goniometer and functional activity ability hands with the Disability of the Arm, Shoulder and Hand (DASH) questionnaire. Results: There was a decrease in the motion pain degree from VAS 7 to VAS 4, and the degree of tenderness pain from VAS 5 to VAS 2. There was an increase active flexion-extension movement of the 4th finger dextra from (S)=25°-0°-50° to (S)=40°-0°-75°, while passive movement from (S)=30°-0°-60° to (S)=40°-0°-75°. There was a decrease in the value of hand disabilities based on the results of the DASH questionnaire from 24% to 21%. Conclusion: The application of extracorporeal shockwave therapy and active finger blocking exercise can reduce the pain, increase the range of motion and functional abilities patient diagnosed Trigger the 4th Finger condition.

Key Words : Trigger finger, ESWT, Active Finger Blocking Exercise, Physiotherapy
INTRODUCTION

Trigger finger is also known as stenosing tenosynovitis, which is a traumatic condition that involves the formation of nodules in the tendons of m. flexor digitorium due to a combination of repetitive finger movements or local trauma and impaired healing. As a result, the affected finger will lock in either flexion or extension thereby inhibiting movement and digital manipulation (Itsiopoulos, 2017). The National Health Interview Survey (NHIS) estimates the prevalence of trigger finger as one of the 3 most common types of disease in the upper extremity group, the prevalence of tendosynovitis consisting of trigger finger is 32%, de Quervain’s syndrome is 12%, and carpal tunnel syndrome (CTS) is 40%, while epicondylitis is 16% (Fauzi, 2015). In Indonesia alone, prevalence data regarding trigger finger cases according to the National Health Interview Survey (NHIS) trigger finger cases occur around 32% per year (Deskur, 2017). The incidence of trigger finger is estimated at 28 cases per 100,000 people in the population each year. This condition can occur to anyone, but is more often found in people with diabetes, rheumatoid arthritis, and women aged 50 to 60 years (Fauzi, 2015).

Physiotherapy interventions that can be used in cases of trigger finger are in the form of extracorporeal shockwave therapy and active exercise. Extracorporeal shockwave therapy (ESWT) is a method that uses a shock current that has a wide frequency (0-20 MHz) and pressure amplitude (0-120 MPa). ESWT itself has 2 wave characteristics, namely positive and negative. The positive phase generates cavitation and gas bubbles which then explode at high speed, producing a second wave of shock waves (Van der Worp H, 2018). ESWT is effective for reducing pain severity and increasing general functional capacity, range of motion, grip strength, and pinch strength in patients with trigger finger conditions.

MATERIALS AND METHODS

1. Design Study

Method research used _ on case. This use studies case. Performed in Rehab Siloam Sriwijaya Hospital Palembang on a patient initials Mrs. _ "N" age 47 profession as Mother House ladder And religious islamic

2. Instrument Study

a. Painful with Visual Analogue Scale (VAS)

Asked pain-covers painful moment activity And painful with evaluation painful as following:

0 cm : no painful
10 cm : pain not bearable

b. Wide motion joints with Goniometer

According to (Prasetyo, E, 2021) inspection This done with use goniometer and _ can be measured on motion active nor passive on IV finger dextra as well as refers on ISOM criteria with normal values are:

Extension-Flexion : 45°-0°-90°

c. Activity functional with Disabilities of the Arm, Shoulder and Hand (DASH)

Criteria DASH assessment, namely:
0%-25% : Normal (Functional radius normal l)
3. Method Data Retrieval
   a. Primary data
      1) Inspection Physique
         Inspection This consists from vital signs , inspection , palpation , examination movement basic , and environment purposeful activity _ For know circumstances physique patient .
      2) Interview
         Method This done with method ask answer between physiotherapist with patient Good in a manner directly ( autoanamnesis ) or in a manner No directly ( heteroanamnesis ).
      3) Observation
         Observation done For know development patient during done therapy.
   b. Secondary Data
      1) Studies Documentation
         In studies case This exists documentation , author observe And learn development patient during done therapy .
      2) Studies References
         Studies References obtained from byku-books , e-books, and related journals _ with condition on case trigger finger.

PHYSIOTHERAPY PROGRAM

Management physiotherapy on case trigger finger done to patient during patient follow whole session home treatment . Objective gift intervention physiotherapy is For reduce pain , improve wide motion joints on finger to IV dextra And increase activity functional . Intervention physiotherapy consists from extracorporeal shockwave therapy and therapy exercise form active finger blocking exercise .

1. Extracorporeal Shockwave Therapy
   Extracorporeal shockwave therapy (ESWT) is a new scientifically validated method for treating chronic soft tissue injuries . Focus is used to treat injuries or soft tissue diseases. Extracorporeal shockwave therapy is also used to treat tendinitis . The dose given in trigger finger cases for low energy ESWT (1500 impulses and 0.006 j/mm 2.3bar) once a week for 4 weeks and high energy ESWT (1500 pulses and 0.01 j/mm 5.8bar) once a week for 4 weeks (Chen et al., 2021).

2. Exercise Therapy
   Active finger blocking exercise is a movement that is carried out by the strength of the muscles and the limbs themselves without assistance, movements produced by contractions against full gravity. Method used _ form exercise active finger blocking exercise Which done consciously with the active contraction of the limb itself And compression of the middle phalanx with a blocking procedure can increase the gliding resistance of the tendon , flexor digitorum proundus (FDP) increases the force applied to
the tendon during flexion of the distal inter phalangeal (DIP) joint (RB, 2018).

RESULTS AND DISCUSSION
1. Decline Painful with Scale Visual Analogue Scale

Inspection painful on trigger finger with using the Visual Analogue Scale.

Graph 1 Pain Examination Results

From the chart on concluded that after done action physiotherapy obtained results exists decline painful motion \( T_1 = 7 \) (pain weight) to \( T_6 = 4 \) (pain light) and exists decline painful press \( T_1 = 5 \) (pain moderate) to \( T_6 = 2 \) (pain light). this in accordance with research conducted by Really (2018) where effect administration of extracorporeal shockwave therapy (ESWT) via gift hyperstimulation nociceptors /gate control and transmission pain, change neurotransmission receptor pain, and with increase substance inhibitor painful later local stimulate nociceptive C fibers play a role in analgesia and increase neuropeptide release thus cause fibroblast stimulation and vasodilation.

On the side administering ESWT to patients also given therapy exercise active finger blocking exercise to maintain elasticity participating muscles moment done movement active and give stimulus for integrity bone and joints (C. Kisner, 2018). So that moment elasticity muscle and integrity between bone and joints well, then the pain caused by elasticity muscle and integrity network around less getting better will decreased.

2. Enhancement Wide motion joints IV finger dextra

Results inspection measurement wide motion joints in a manner active and passive from \( T_1 \) to \( T_6 \) with can be seen using a goniometer in the diagram below this:

Graph 2 Measurement of Joint Movement

Results evaluation wide motion joints active on IV finger dextra on move active flex-extension obtained results as following, on movement \( T_1 \) sagittal plane obtained results of \( S \) 25-0-50 and \( T_6 \) occur upgrade \( S \) 40-0-70. Results evaluation wide motion joints passive on IV finger dextra on movement flex-extension obtained results as following, on sagittal movement for \( T_1 \) was obtained result \( S \) 30-0-60 at \( T_6 \) to 40-0-75.

Enhancement wide motion joints IV finger dextra on trigger finger is effect gift from therapy exercise active finger blocking exercise. Active finger blocking exercise can increase strength muscle and flexibility joints so that raises stretching (Talan et al, 2009). Exercise active finger blocking exercise also can restore prone to motion and prevent stiffness and lost motion consequence tendon adhesion.
3. Enhancement Ability functional

Inspection ability functional on condition of trigger finger using disability of the arm, shoulder and hand.

Graph 3 Passive LGS Examination Results

physique individual related disturbance on hand and finger.

Graph 4. Results of Examination of Functional

After done therapy with use of extracorporeal shockwave therapy and therapy exercise form of active finger blocking exercise was obtained results that there is enhancement ability functional on IV finger dextra with use disability of the arm, shoulder and hand (DASH) on Mrs. "N" for 6 times of therapy obtained T1 result with representation as much as 24% and at T6 happen enhancement to 21%.

Happening enhancement ability functional on finger to IV dextra on Mrs. N measured use questionnaire disability of the arm, shoulder and hand (DASH) is effect gift modality extracorporeal shockwave therapy (ESWT) and active finger blocking exercise. Intervention extracorporeal shockwave therapy (ESWT) emits wave surprise you can destroy broken network. And start recovery on the damaged part with facilitate formation vessels blood (Wang, C, 2012). Active exercise that is guard training elasticity and contractility muscles, giving feedback between muscle and system senses, giving stimulus for integrate bone and network joints, as well increase coordination and motor for activity functional (C. Kisner, 2018).

CONCLUSIONS AND SUGGESTIONS

Conclusion

After done therapy as many as 6x therapy was obtained results as following:
1. There is decline painful
2. There is enhancement wide motion joints on IV finger dextra
3. There is enhancement ability activity functional

Suggestion

Patient suggested for do therapy in a manner routine and do exercises in the form of a recommended home program therapist for the healing process get optimal results.

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