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The Role of Scapular Power in Resolving Lateral Elbow Pain: A Detailed Case Analysis

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Abstract:

- ***Background:***
  While the clinical presentation of lateral epicondylalgia is remarkably consistent across patients, its underlying causes are far more complex and multifaceted. The traditional moniker "tennis elbow" is actually a bit of a misnomer; in reality, less than 5% of diagnosed individuals actually participate in the sport. Given this disconnect, the term lateral epicondylalgia serves as a more accurate clinical descriptor for the diverse range of patients—from office workers to manual laborers—who present with this specific pathology.

- ***Objective:***
  To evaluate the role of Scapular Power in Resolving Lateral Elbow Pain.

- ***Study Design:***
  Single case study.

- ***Method:***
  A 54year old female with lateral epicondylalgia. Subject underwent formal evaluation of inclusion criteria of the study in which the clinical test was done and signed written consent has been taken from the subject. The participant underwent four weeks of supervised physiotherapy intervention Treatment involved a multi-modal strategy: targeted strengthening, bimodal wrist extensor training (both concentric and eccentric), and localized ultrasound.

- ***Outcome Measures:***
  PRTEE (The Patient-Rated Tennis Elbow Evaluation), hand held Dynamometer.

- ***Result:***
  The results were definitive: prioritizing the scapular muscles led to a more rapid easing of symptoms and a sharper recovery of hand function. Both the subjective pain scales and the objective grip strength measurements showed a markedly better trajectory following the intervention.

- ***Conclusion:***
  Four weeks of scapular muscle strengthening exercise training have beneficial effects on lateral epicondylalgia results in improved pain and functional disability.

Keywords: *Lateral Epicondylalgia, Scapular Muscle Strengthening, Functional Disabilit.*

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I. INTRODUCTION

Tennis elbow, term specifically identifies the localized discomfort radiating from the humerus's lateral epicondyle, serving as a pinpoint for diagnosing outer elbow distress.

It is an over use injury, characterized by degeneration and impaired healing rather than an inflammatory process.Lateral epicondylalgia is Characterized by pain in the region of the lateral epicondyle of the humerus. The prevalence of lateral epicondylalgia in general population is about 1-3% between 30 and 64 years of age with the peak

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incidence between 45and 54 years of age.it seems to affect both males and females equally.

This condition develops due to overuse and may lead to hyaline degeneration at the origin of the extensor tendon. Repeated overuse of the forearm and elbow muscles, especially during activities involving repetitive contractions or manual tasks, places excessive strain on the elbow tendons. Tasks that require frequent hand manipulation cause the tendon to adapt poorly over time, resulting in structural changes within the tendon. These changes eventually lead to pain around the lateral epicondyle. The pain is most commonly felt slightly anterior and distal to the lateral epicondyle.

The most common method among patients with lateral epicondylalgia is conservative management. . In the only study with a 2-year follow-up after physiotherapy intervention, it was found that more than half the patients experienced persistent pain and functional impairment due to a relapse of lateral epicondylalgia symptoms.

There are several studies available that are supporting the relationship between scapular muscles & lateral epicondylalgia. The weakness of the strength of the proximal muscle or instability of the proximal muscle needs more work at the distal joints and can cause distal pathology such as lateral epicondylalgia. The kinetic chain theory offers a theoretical basis for the relationship between the importance of scapular musculature and muscle function at the elbow.

II. CASE HISTORY

The patient was a 54-year-old female who is a sweeper and is presented with the complaints of pain on the lateral epicondyle of humerus. The diagnosis of lateral epicondylalgia was determined by physical therapy examination and evaluation.

The patient came to physical therapy with a 3-month history of pain on the lateral side of the elbow. The pain started gradually, and the severity of the pain was severe with activity and relieved with rest. The patient does not take any treatment for the pain. The patient does not have any past medical records.

By taking the subjective and objective information during our examination. It was our analysis that the patient has reduced grip strength and reduced active wrist movement. There is no presents of deformity and external appliances are absent. The patient having tenderness grade 3 and there is no presence of oedema.

By taking detailed examination of sensory and motor patient does not have any sensory deficit. The range of motion of both wrist joint was performed range of wrist flexion of the left hand was reduced to 10-degree wrist extension was reduced to 14 degrees. Manual muscle testing has performed as described as Kendall.

Muscle strength of wrist flexion is 4/5 wrist extension 3/5, radial deviation 4/5, ulnar deviation4+/5. She was given scapular muscle strengthening exercise for about a month. The post-test was taken using the same outcome measure used in pre-test after 4 weeks of treatment intervention.

➢ *Objective of the Study*

To evaluate the role of Scapular Power in Resolving Lateral Elbow Pain.

III. MATERIALS AND METHODOLOGY

➢ *Materials Used*

- Pen
- Pencil
- Dumbbell
- Stool
- Dynamometer
- Thera band

➢ *Study Setting*

Cooperative Institute of Health Science, Thalassery, Kannur, Kerala.

➢ *Study Design*

Single case study

➢ *Study Duration*

1 Month

➢ *Outcome Measures*

- PRTEE score
- Hand-held dynamometer

➢ *Selection Criteria*

- Inclusion criteria
- Subject willing to participate
- Presented with and at least one of the following positive clinical tests.

✓ Mills test
✓ Cozens sign
✓ Maudsley's test

- Exclusion criteria
- Cervical spondylosis
- Disc prolapses
- Osteoporosis
- Malignancy

IV. STUDY PROCEDURE

The study was conducted on a 54 year old female with lateral epicondylalgia. Subject underwent.formal evaluation of inclusion criteria of the study in which the clinical test was done and signed written consent has been taken from the subject. To get a clear picture of the patient's baseline, we

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utilized the Patient-Rated Tennis Elbow Evaluation (PRTEE) to quantify their pain levels. This was paired with a hand-held dynamometer, allowing us to capture an objective measurement of their grip strength alongside their subjective reports of discomfort.

The treatment includes scapular muscle strengthening along with concentric and eccentric wrist extensor strength training and ultrasound (continuous, 1.2W/cm2, 8 min). At the end of 4 weeks, intervention subject underwent post-test evaluation of PRTEE (The PatientRated Tennis Elbow Evaluation), hand held dynamometer to find out the effectiveness of the intervention.

➢ *Conventional Exercise Protocol*

- *Ultrasound:*

Local ultrasound was given to the subject over the lateral epicondyle. Continuous ultrasound

✓ *Using Frequency:*

1 MHz & Intensity: 1.2 W/Cm2 was given to the subject for 8 minutes

- *Wrist Extensor Exercise:*

The exercise protocol focused on progressive wrist extensor loading using elastic resistance. To ensure proper form, the patient was seated with their elbow flexed and the forearm supported on a table, allowing the wrist to move freely through its full range. The resistance band was anchored under the foot on the same side and held firmly in the hand.

➢ *The Movement Consisted of Two Distinct Phases:*

- *Concentric Phase:*

A slow transition from passive flexion into full wrist extension with the forearm pronated.

- *Eccentric Phase:*

A controlled, gradual return from full extension back into flexion.

The patient performed two sets of ten repetitions, six days a week, with a recovery period of two to five minutes between sets. To standardize the intensity, we used a ten-repetition test to select the appropriate band (light, medium, or heavy) and adjusted the length until ten reps felt challenging. This initial length was marked with permanent ink to ensure the resistance remained consistent across all home sessions.

Safety was a priority; had the patient experienced sharp pain even with the lightest band, they were instructed to perform the movements without resistance for the first week. As their tolerance improved, they were encouraged to increase the load by shortening the band in one-inch increments, provided they could comfortably complete three sets. A formal re-evaluation was conducted at the four-week mark to track progress.

➢ *Scapular Muscle Strengthening:*

Four key scapular stabilizing muscles—namely the upper trapezius, serratus anterior, middle trapezius, and lower trapezius—were selected for the strengthening program. A 10-repetition maximum (10RM) test was performed for each muscle to determine the appropriate training load. Strengthening was initially carried out using the identified 10RM weight. Patients were instructed to perform two sets of ten repetitions for each scapular strengthening exercise, with a rest period of 2 to 5 minutes between sets.

V. DISCUSSION

The purpose of this study was to determine the effectiveness of scapular muscle strengthening in the management of lateral epicondylalgia. According to a study by Anumol C and Aneesh John, based on the kinetic chain theory, upper-extremity dominant activities involve energy generation and transfer that follow a proximal-to-distal sequence. When the scapula is inadequately stabilized, greater energy demands are placed on the distal segments of the upper limb during functional activities.

The lower trapezius and serratus anterior form an important force couple that provides scapular stability and facilitates sustained upward rotation during overhead movements. Weakness in these scapular stabilizers can disrupt energy transfer, leading to increased workload on distal muscles. This increased load may aggravate pain and contribute to reduced functional performance in individuals with lateral epicondylalgia.

A study conducted by Hector Gutiérrez-Espinoza et al. examined the effects of conventional treatment combined with a scapular exercise program in patients with chronic lateral elbow tendinopathy. The study followed a single-group pre-test and post-test design. The primary outcome measure was the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire. The results showed statistically and clinically significant improvements in all functional outcomes at the end of six weeks and at one-year follow-up in patients who received conventional treatment along with scapular exercises.

In the present study, patients received scapular muscle strengthening exercises in addition to concentric and eccentric wrist extensor strengthening and therapeutic ultrasound (continuous mode, 1.2 W/cm² for 8 minutes). After four weeks of intervention, post-test evaluation was performed using the PRTEE questionnaire to assess treatment effectiveness. PRTEE scores were recorded on the first day (pre-test) and the final day (post-test) of treatment.

Since occupational demands vary among individuals and place different levels of strain on the upper limb, changes in work-related function were also considered while interpreting PRTEE scores.

Four key scapular stabilizing muscles—the upper trapezius, serratus anterior, middle trapezius, and lower trapezius—were selected for strengthening. A 10-repetition

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maximum (10RM) test was conducted for each muscle to determine the appropriate training load. The strengthening program was initiated using the identified 10RM weight. Patients were instructed to perform two sets of ten repetitions for each scapular strengthening exercise, with a rest interval of 2 to 5 minutes between sets.

The pre-test PRTEE total score was 64, and grip strength was 20.83 kg. Following the intervention, the PRTEE total score improved to 46, and grip strength increased to 24.5 kg. A significant improvement was observed between the pre-intervention and post-intervention values, indicating that scapular muscle strengthening exercises have a positive effect on pain reduction and functional improvement in patients with lateral epicondylalgia.

VI. CONCLUSION

The research was carried out to examine the efficacy of scapular muscle strengthening in the management of lateral epicondylalgia in women. The research was carried out for 4 weeks. The PRTEE score used to measure the pain and disability and hand-held dynamometer used to measure the hand grip strength. The physiotherapy procedure is scapular muscle strengthening exercise. The pre-test value of PRTEE Total score is 64 and grip strength is 20.83°. After the treatment pain reduced and the value of PRTEE Total is 46 and grip strength is 24.5°. Therefore, result concluded the pre-test value of PRTEE Total score is 64 and grip strength is 20.83°. At the end of treatment, the value of PRTEE Total is 46 and grip strength is 24.5.

LIMITATIONS

- The duration of the study was too short
- The study included only single subject
- Only short-term effects being evaluated

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