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Multi-pronged approach to the management of de Quervain's tenosynovitis: A case study

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Abstract
In de Quervain's tenosynovitis, the extensor retinaculum, a structure that helps to stabilise the wrist joint by enclosing and supporting the first dorsal compartment, thickens abnormally. As a result of overuse or repeated stress, the problem usually manifests as radial wrist discomfort that becomes worse while doing motions like ulnar deviation, thumb extension, and abduction. The purpose of this case study is to examine the efficacy of a multi-modal strategy in treating De Quervain's tenosynovitis, which includes taping, eccentric exercises, and ultrasound.
A 29 year old right hand dominant female with De Quervain's tenosynovitis was provided an individualised therapy for 5 sessions per week for 4 weeks. Numerical pain rating scale (NPRS) and Patient Rated Wrist Evaluation (PRWE) were used to measure pain and wrist function before and after treatment. The PRWE and NPRS scales showed a significant difference in pre and post treatment. Taping when combined with eccentric exercises and ultrasound is effective in reducing pain and swelling in De Quervain's tenosynovitis.

Keywords: De Quervain's, taping, eccentric exercises, tenosynovitis, multi-pronged

1. Introduction
Overuse or an increase in repetitive activity can lead to shear microtrauma in the abductor pollicis longus and extensor pollicis brevis tendons, which in turn can cause De-Quervain's tenosynovitis (DQT), a painful tenosynovitis of the first dorsal compartment of the hand [1]. Among those aged 30-55, the reported prevalence of DQT is 0.5% in men and 1.3% in females [2]. Common signs of this condition include discomfort during the Finkelstein test, pain upon probing of the first dorsal compartment, and pain on the radial side of the wrist. Repetitive ulnar wrist deviation, followed by repeated thumb extension and abduction, seems to worsen the symptoms. The increased prevalence of de quervain in women aged 30-50 may be due, in part, to hormonal considerations [3]. During menopause, pregnancy, and the postpartum period, it is more prevalent in women [4].
Lifting, grabbing, or doing anything that twists the wrist on the ulnar side causes swelling and discomfort, which are frequent complaints. Both conservative and surgical approaches are possible, depending on the patient's health. Pharmacological anti-inflammatory drugs, corticosteroid injections, splint immobilisation, iontophoresis, therapeutic pulsed ultrasound, and activity reduction are all part of the conservative therapy [5].
The severity of De Quervain's tenosynovitis dictates the approach to conservative therapy. Corticosteroid injections and anti-inflammatory medicine are two of the available choices. The specific procedures used in physiotherapy include educating patients to modify their activities, using splints, doing manual therapies, utilising therapeutic modalities, and managing edoema and scars [6, 7]. Kinesiotaping is different from traditional taping treatments; its structural features are similar to those of human skin, which allows for less restriction and greater movement, which has led to its recent rise in popularity as an essential adjunct approach in the rehabilitation of hand and wrist injuries [8]. Patients suffering with DQT may find relief from discomfort, increased strength, and functional restoration via the use of therapeutic kinesiotaping. Research on the efficacy of kinesiotaping in conjunction with more traditional forms of physical therapy for DQT is warranted. So, the purpose of this case study was to examine how kinesio taping, ultrasound treatment, and eccentric exercise helped a patient who had De-Quervains tenosynovitis."

2. Case report

A 29 year old female started experiencing pain and swelling in her right thumb in January 2024, sudden in onset and gradually progressive in nature. She had difficulty in abducting her thumb, difficulty in holding any objects. She reported that pinching, holding a pencil, lifting a mug of water and pronation all aggravated her pain with no relieving factors. She had consulted a local doctor and was on medication but did not show any improvement. She had no history of any trauma of wrist and hand, diabetes, hypertension or epilepsy. Her diet and appetite was normal and she had no intoxicating habits.

The patient confirmed her discomfort during the physical examination by showing a positive result on the right side of her wrist (Finkelstein's test). A painful pronation, ulnar deviation, and active and passive radial deviation were detected during the examination of the right wrist, in addition to impaired capacity for active, passive, and resistant extension. When testing the right side's thumb mobility, we found that active and resisted abduction were painful, passive adduction was uncomfortable, and both the active and passive motions ended with restricted flexion. Furthermore, both extension and opposition motions had pain and resistance.

The treatment spanned over a period of 3 weeks, during which treatment was given for 5 sessions a week and after which a reassessment was conducted. Treatment modalities included ultrasound, exercise therapy and kinesio taping. Home care guidance encompassed maintaining optimal joint alignment, engaging in exercises that do not provoke pain to enhance range of motion, and utilising soft-tissue manipulation techniques. After every week the range of motion was recorded and the patient rated wrist evaluation was done which showed a marked improvement.

2.1 Physiotherapy management

A patient visiting the outpatient department of a selected tertiary hospital with diagnosis of thumb and wrist pain was included as the subject of this case report. An informed consent was obtained and an initial examination which included demographic data, a brief history of presenting illness and physical examination was done. Based on the evaluation, a three-week, five day per week rehabilitation program was designed. The treatment procedure was explained to the subject in detail. The subject received ultrasound, Eccentric exercises followed by taping for 3 weeks. Pre- and post- outcome measures were measured using Numerical pain rating scale and Patient Rated Wrist Evaluation scale. Ultrasound therapy was administered with the patient seated, ensuring proper support for the treated hand. It was gently applied along the length of the tendon, adhering to specified ultrasound parameters namely continuous mode with 0.8 W/cm2 intensity and 1MHz frequency. Eccentric exercises of wrist, thumb and tendon gliding exercises for adductor pollicis longus and extensor pollicis brevis for 15 repetition with 3 sets followed by Kinesio Taping.

Kinesio tape, sourced from Korea, was applied for taping. For the preparation we need to ensure the skin around the wrist and thumb should be clean and dry before applying the tape. The wrist is positioned in a neutral position (not flexed or extended) to start. The first tape of Anchor strip was secured from distal phalanx of the thumb till the upper 1/3rd of dorsal radius with 70% stretch and the second tape was a T shaped tape, the upper 1/3rd portion was cut into a small circle to insert the thumb. It was applied till the upper 1/3rd of radius with 70-80% stretch. Additional strips of tape, the support strips, each about 1-2 inches wide, depending on the width of the tape were used. The first support strip was applied from the anchor point (below the thumb), across the back of the wrist, and up the forearm towards the elbow. Ensuring this strip covers the area where the painful tendons abductor pollicis longus and extensor pollicis brevis are present After applying the tape, range of motion of the thumb and wrist were checked to provide support while allowing functional movement.

Fig 1: Therapeutic application of K-Tape

2.2 Outcome Measures

In 1998, researchers developed the 15-item Patient-Rated Wrist Evaluation (PRWE) to measure the impact of wrist pain and impairment on everyday activities. The PRWE has now been validated. Its use in clinical settings for the evaluation of certain wrist problems is extensive. The PRWE consists of two parts-the pain subscale and the function subscale—that patients may use to score the severity of their wrist pain and impairment on a scale from 0 to 10. The pain subscale consists of five questions that ask the patient to assess their pain levels while doing various activities, whereas the function subscale consists of six activities.

The Numerical Pain Rating Scale (NPRS) is a 10-point assessment tool utilised by patients to subjectively report pain intensity. It can be administered verbally or through graphical representation for self-completion, with scores ranging from 0 to 10 points. Higher scores on the scale denote increased levels of pain intensity.

3. Results and Discussion

This study examined the effects of a multipronged approach including kinesiotaping, eccentric exercise and ultrasound therapy in treatment of De Quervains disease. The assessment was carried out by performing a thorough evaluation of the patient and comparing the values before and after the intervention.

On examination post treatment, a considerable improvement was seen in pain, joint function and ROM of thumb and CMC joint. The treatment improved the range of motion of thumb flexion from 0-20 degrees to 40 degrees post treatment and thumb abduction from 0-25 degrees to 0-40 degrees. The patient rated wrist evaluation pre intervention score was 85/100 which showed considerable improvement post intervention when the score became 35/100. The Numerical pain rating scale pre-treatment was at 9/10 and post-treatment marked 3/10. Within 4 weeks, there were improvements seen in the patient.

Kinesio tape is helpful in pain, wrist function and ROM of thumb and CMC joint. Research indicates its effectiveness in

reducing pain, improving range of motion and strength, enhancing joint approximation, and potentially aiding recovery from De Quervain's tenosynovitis [10].

The physiological effects of kinesiotaping are based on several mechanisms such as facilitation of muscle function; Kinesiotape is believed to lift the skin slightly, which may create space underneath. This can reduce pressure on pain receptors and enhance muscle activation. The tape's elastic properties can also provide feedback to the muscles, potentially improving muscle contraction. Also by applying the tape in specific patterns, kinesiotape can provide support to muscles and joints. This can help improve joint alignment and stability during movement, which may reduce the risk of injury or provide support to injured tissues.

In addition, kinesiotape may stimulate mechanoreceptors in the skin, which can affect pain perception. Additionally, by providing support and improving circulation, kinesiotape may help alleviate pain associated with muscle tension or inflammation [11].

Eccentric exercise enhances De Quervain's tenosynovitis management by systematically loading and strengthening the affected tendons and muscles of the thumb and wrist. This approach fosters tendon adaptation and functional improvement, thereby alleviating symptoms progressively.

3.1 Limitations

Long term follow ups were not done. Only a single case study was taken. Home exercises were unsupervised.

4. Conclusion

A multi-pronged approach of ultrasound, eccentric exercises and kinesio taping in patients with De quervain's tenosynovitis is effective in reducing the pain and swelling to a substantial level.

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