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A Systematic Review on De Quervain's Tenosynovitis

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ABSTRACT:

De Quervain's Tenosynovitis is a condition that involves tendon entrapment and affects the first dorsal compartment of the wrist. Although the exact cause is unknown, de Quervain tenosynovitis has been associated with myxoid degeneration with fibrous tissue deposits and increased vascularity as opposed to acute inflammation of the synovial membrane. In clinical practice, the Finkelstein and Eichhoff tests are commonly used to identify DQD. with the Finkelstein test, the examiner applies hard traction longitudinally and toward the wrist's small ulnar deviation with one hand while holding the patient's thumb firmly with the other. The Eichhoff test, on the other hand, requires the patient to clench their fingers and oppose their thumb into their palm while the examiner passively administers ulnar deviation to their wrist. First-line treatments include corticosteroid injections, systemic anti-inflammatory medications, and splinting.

Keywords: De Quervains Tenosynovitis(DQD), Finkelstein test, Eichhoff test, Corticosteroids, Anti-inflammatory drugs

INTRODUCTION:

De Quervain's Tenosynovitis is a disorder that affects the wrist's first dorsal compartment and involves tendon entrapment. Where the tendons enter through the fibro-osseous tunnel along the radial styloid at the distal wrist, thickening and myxoid degeneration of the tendon sheaths surrounding the abductor pollicis longus and extensor pollicis brevis occur.[1] Thumb movement and wrist radial and ulnar deviation aggravate pain.[2][3] Usually, the illness strikes women in the latter stages of pregnancy or the postpartum phase.

According to the preliminary research, myxoid degeneration, not an underlying inflammatory disease, is the cause of DQD [5,8]. Conversely, current research focuses on the inflammatory indicators that could lead to a susceptibility to this illness [3,8,]. Recently, other risk factors have been identified, such as genetic predisposition and exposure to somatotropin [3]. Numerous experiments have revealed anatomical variances of the first dorsal extensor compartment, and these variations have been demonstrated to affect the results of treatment [1]. Consequently, it has been assumed that the anatomical variance exhibits variable success rates across various treatment regimens [2,3].

Immobilization and a corticosteroid injection in the first dorsal compartment serve as the initial nonoperative treatments in the management process. Conservative treatment is beneficial for most people. The first dorsal compartment should be surgically released in patients whose discomfort cannot be relieved by nonoperative treatment.

Etiology:

De Quervain tenosynovitis has been linked to myxoid degeneration with fibrous tissue deposits and enhanced vascularity rather than acute inflammation of the synovial membrane, while the precise reason is unknown. The abductor pollicis longus and extensor pollicis brevis tendons are painfully trapped by the thickening of the tendon sheath caused by this deposition. It is linked to recurrent wrist motions, particularly the simultaneous extension, radial wrist deviation, and thumb radial abduction. Mothers of newborns who frequently lift their babies with their thumbs radially abducted and their wrists moving from ulnar to radial deviation are the classic patient population.[6] The condition may have several etiologies, such as pathogenic origins, acute wrist injuries, higher frictional forces from vigorous wrist and thumb movements, structural differences in the first dorsal compartment and inflammatory diseases.[7][8]

Epidemiology:

According to one study, de Quervain tenosynovitis is most common in people in their forties and fifties, with a prevalence of 0.5% in males and 1.3% in women.[7] According to a different survey, the prevalence was 0.13% for men and 0.36% for women.[8] People who have already experienced medial or lateral epicondylitis may be more susceptible to the illness. Bilateral involvement is frequently observed in new moms or childcare providers, and it usually resolves on its own after the kid is lifted less frequently.[1][2] Two important risk factors for the condition are manual labor and pregnancy.[3]

Pathophysiology:

The extensor retinaculum separates the wrist's extensor tendons into six extensor compartments.[5] The abductor pollicis longus and extensor pollicis brevis tendons are located in the first dorsal compartment of the wrist, which is isolated from the other five dorsal wrist compartments by a synovial membrane. These tendons are susceptible to entrapment, especially in cases of acute trauma or repetitive motion, as they go through a fibrous tunnel that is about 2 cm long and crosses the radial styloid and passes beneath the transverse fibers of the extensor retinaculum.[8][1] A "stenosing" tenosynovitis of the wrist results from the thickening of the tendon sheath, which shrinks the first compartment.[4]

The increased stress on the tendon sheaths causes fibrocartilage to develop, which thickens the sheaths. The tendon sheaths exhibit neovascularization. In this situation, myxoid degeneration is also observed in the tendons. The first dorsal compartment between the two tendons frequently has a septum, which restricts the capacity of the first compartment and has significant implications for both nonoperative and surgical treatment.[5]

DIAGNOSIS :

In clinical practice, DQD is frequently diagnosed using the Finkelstein and Eichhoff tests [7]. In the Finkelstein test, the examiner uses one hand to grip the patient's thumb firmly while using the other to apply firm traction longitudinally and toward the wrist's minor ulnar deviation. The Eichhoff test, on the other hand, asks the patient to clench their fingers and oppose their thumb into their palm while the examiner passively applies ulnar deviation to their wrist [8]. Despite their effectiveness, these techniques are criticized for producing uncomfortable examinations and false-positive outcomes. These results are explained by the fact that they are passive testing, which has the drawback of putting stress on several structures that aren't directly related to DQD pathophysiology. While both tests have these drawbacks, a 2018 investigation showed that the Finkelstein test has a greater specificity and fewer false positives than the Eichhoff test [7, 8]. The Finkelstein and Eichhoff tests in that study had documented specificities of 100% and 89%, respectively [8]. A new active diagnostic technique known as the wrist hyperflexion and abduction of the thumb test (WHAT) has surfaced as a result of the debate these tests have caused. In WHAT, the patient is instructed to abduct their thumb and actively hyperflex their wrist while the examiner applies counterpressure with their index finger, which will cause discomfort if DQD is present [7, 8].

By reducing shear between the APL/EPB and the bone floor of the first extensor compartment, this test detects DQD aggravation [7, 8]. In addition to these advantages, another study found that the WHAT test had much greater specificity and sensitivity values than the Eichhoff test, demonstrating that it is a more accurate diagnostic tool for DQD. The Eichhoff test's specificity in that conversation was 14%, whereas the WHAT test's was 29%. Additionally, it was shown that the sensitivity of the two tests was 89% and 99%, respectively [8].

According to the majority of research, patients who have septation in the wrist's first dorsal extensor compartment are more likely to experience difficulties after therapy and develop De Quervain's syndrome [9]. Ultrasonography is a great diagnostic tool for detecting this septation prior to treatment. The effectiveness of ultrasonography in identifying the APL and EPB tendons, their diameters, and whether or not there is a septum between them has been the subject of some research. Preoperative ultrasonography was performed on the wrists of 32 DQD patients in Nagaoka's clinical research, and it was able to detect septation in 25 of them prior to surgery [3].

To greatly lower the danger of postoperative problems, this approach may be useful in detecting De Quervain's and determining the patient's wrist's potential anatomy prior to starting the treatment plan. There are several restrictions on this tool. First, the doctor needs to be aware that a septum typically appears on ultrasonography as a hypoechoic region. Other lesions that should be differentiated include fluid, synovial growth, and intratendinous degeneration, which may also be viewed as a hypoechoic region [9]. All things considered, ultrasonography may be the key to detecting anatomic differences, which could help reduce the likelihood of problems following therapy and symptom regression [9].

TREATMENT:

Without treatment, de Quervain tenosynovitis may go away on its own. The most commonly used nonsurgical therapy options for patients with prolonged symptoms include corticosteroid injections, systemic anti-inflammatory drugs, and splinting. Patients may have short-term relief from splinting with a thumb spica brace, although compliance is frequently low and failure and recurrence rates are frequently high.[8][9] For patients who would prefer not to pursue any kind of intervention, splinting might be a short-term solution. Only patients with minor pain may benefit from wrist immobilization alone. Furthermore, severe immobilization in a hard splint or thumb spica cast may be harmful since it may worsen the myxoid degeneration of the affected tendons. Thus, immobilization with a semi-rigid, detachable splint might be more beneficial.[1]

According to reports, 52% to 90% of patients experience nearly total relief with just one or two corticosteroid injections.[2] The tendons are palpable, and the injection is made into the tendon sheath 1 cm proximal to the radial styloid. To reduce the danger of hypopigmentation and subcutaneous atrophy, it is important to palpably penetrate the sheaths of the extensor pollicis brevis and abductor pollicis longus as deeply as possible in the fibro-osseous tunnel. The many septae and sheaths that may be present in the first dorsal extensor compartment can be seen and adequately injected with ultrasound guidance during injection, according to reports.

When the corticosteroid injection is carried out under ultrasound guidance, the success rate rises.[3] About half of patients claim that a single injection relieves their symptoms. An further 40% to 45% of individuals may have alleviation with a second injection. Hypopigmentation and fat and dermal atrophy are possible side effects of steroid injections; these are usually linked to subcutaneous injections rather than those in the tendon sheath. Over time, these can get better or go away. Additionally, weakening of the tendons from repeated injections in a short period of time may lead to their thinning and ultimately rupture.

There is no consensus or high-quality evidence about the efficacy of the several different nonoperative treatment techniques that have been described, such as acupuncture, therapeutic ultrasound therapy, and laser therapy.[4]

Operative management is an option if symptoms do not improve or return after two corticosteroid injections. Typically, surgery is done as an outpatient procedure. Local, regional, or general anaesthesia may be used, and a tourniquet is usually used to stop intraoperative bleeding and make it possible to identify important anatomical features.

A transverse skin incision of about 2 cm is made over the first dorsal compartment to accomplish this. Blunt dissection reveals the ligament covering the first dorsal compartment, with care taken to prevent damage to the branches of the superficial radial sensory nerve. Next, a sharp incision is made along the dorsal margin of the sheath. If there are subsheaths, they are located and cut off. Following the release of every subcompartment, the skin is sealed, a heavy, supple dressing is put on, and early mobilization is carried out. Numerous surgical technique variants, such as endoscopic procedures and partial removal of the extensor retinaculum, have been documented in the literature. Low rates of complications and high rates of symptomatic improvement are documented regardless of the approach.[4]

Without treatment, de Quervain tenosynovitis may go away on its own. The most commonly used nonsurgical therapy options for patients with prolonged symptoms include corticosteroid injections, systemic anti-inflammatory drugs, and splinting. Patients may have short-term relief from splinting with a thumb spica brace, although compliance is frequently low and failure and recurrence rates are frequently high.[9]. For patients who would prefer not to pursue any kind of intervention, splinting might be a short-term solution. Only patients with minor pain may benefit from wrist immobilization alone. Furthermore, severe immobilization in a hard splint or thumb spica cast may be harmful since it may worsen the myxoid degeneration of the affected tendons. Thus, immobilization with a semi-rigid, detachable splint might be more beneficial.[1]

Sharp transection, traction injury, or scarring-related compression can all cause damage to the superficial radial nerve that covers the first dorsal compartment. Extreme sensitivity, discomfort, and paresthesias may ensue from this. This can occasionally resolve on its own, but in rare cases, surgery may be necessary to treat a neuroma or cause neurolysis. With wrist flexion and extension after the release, patients may also experience subluxation of the first dorsal compartment tendons. When the tendons sublux or rub on the radial styloid, this could be uncomfortable. This could be related to the tendon sheath being too released after surgery. Another consequence of surgically treating this problem is hypertrophic scarring.[4][5] [1]

Latest Treatment Approaches:

Here, we provide an overview of special new therapeutic approaches for tenosynovitis, including ultrasound, phonophoresis, iontophoresis, and the Graston technique, that can help and even speed healing for DQD patients during their course of treatment. It has been determined that patients who have had surgical tendon repairs within the last six weeks or who have acute inflammation are contraindicated for high 3 MHz frequency ultrasound [4]. Ultrasound is used in phonophoresis and sonophoresis to guide topical anti-inflammatory drugs deeper into tissues. Iontophoresis, on the other hand, reduces edema, inflammation, scar tissue, and pain by applying an electrical current or gradient to superficial areas of the hands or feet [5,7].

These methods are frequently applied to individuals with hyperhidrosis, but they have also shown promise in treating stenosing tenosynovitis, including DQD, and chronic overuse tendinopathies. Furthermore, it's unknown if these delivery techniques effectively reach the targeted tissues before being diluted by the microvasculature. By adhering to Wolf's Law, which states that tissue remodels in response to stress, the Graston technique seeks to induce controlled microtrauma to the targeted soft tissue in order to enhance mobilization and regeneration [3]. The DQD therapy timeline shows a trend that improves stenosing tenosynovitis rehabilitation and shortens the time it takes for a patient to recover from chronic pain and regain strength with these new treatment approaches and other advancements. The most important disclaimer about these treatments is the need for additional study on their effectiveness and similarity to existing surgical and non-surgical therapeutic approaches.

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