International Journal of Web of Multidisciplinary Studies
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
website: https://ijwos.com
Volume 3 Issue 7 , July 2026
OPEN ACCESS
E-ISSN : 3049-2424
DOI: https://doi.org/10.71366/ijwos03072632326

Trigger Thumb (Stenosing Flexor Tenosynovitis): A Comprehensive Review

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Article Info

Article History:

Published: 5 July 2026

Publication Issue:
Volume 3, Issue 7
July-2026

Page Number:
132-144

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Abstract:

Background: Pain, clicking, catching, or locking of the thumb are the hallmarks of trigger thumb, also called stenosing flexor tenosynovitis of the thumb, a common hand problem characterized by dysfunctional gliding of the flexor pollicis longus (FPL) tendon through the A1 pulley. The condition can significantly impair hand function and quality of life and is frequently linked to rheumatoid arthritis, diabetes mellitus, and other systemic disorders.

Objective: to examine the most recent research on trigger thumb's epidemiology, anatomy, pathophysiology, clinical characteristics, diagnosis, and treatment, with a focus on evidence-based physical therapy.

Method: In order to complete this work, papers containing the terms "trigger finger," "therapy," and "adult trigger finger" were reviewed and searched using search engines. Fifty journals that were appropriate for our references were found by the writers.

Outcome: There are several approved therapy options for trigger finger. When it comes to trigger fingers, a particular kind of treatment should be taken into consideration. To improve treatment results, this should be taken into account. To select the most economical course of action for patients with trigger finger, cost analysis is also crucial.

Conclusion: For selecting the precise course of treatment, there is no precise consensus suggestion. Unlike in adults, trigger finger is caused by a complex mechanism that leads to unexpected conservative therapy effects. While some adult trigger finger instances may be resolved surgically, the majority of cases will require conservative measures. To create a therapy plan for these adults with trigger fingers, more extensive research is required.

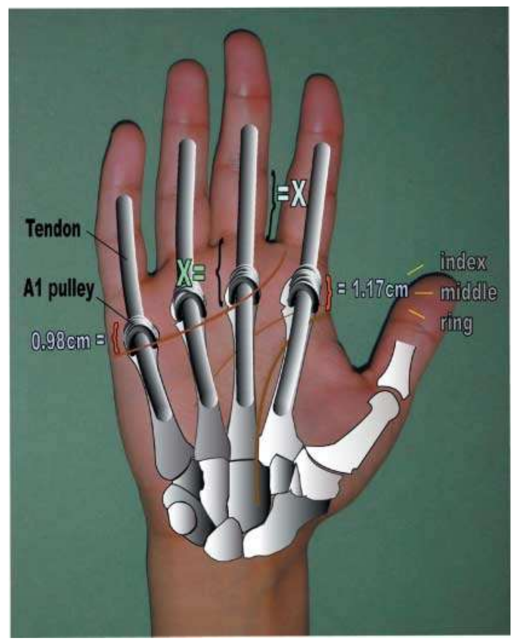
Keywords: Trigger thumb, stenosing flexor tenosynovitis, A1 pulley, flexor pollicis longus, physiotherapy, tendon-gliding exercises, splinting

1. INTRODUCTION

From a national standpoint, TF is the more prevalent ailment in our nation. Therefore, it is necessary to identify risk factors and functional limitations for TF in addition to providing appropriate therapy. Because of their frequent moves, TF is growing daily from a national standpoint. Thus, the most crucial aspect of service management is expectation. Every patient seeks to determine the efficacy of the treatment regimen for TF patients receiving hand therapy services, and their expectations for their hands are based on the quality and efficacy of the services. The majority of Bangladeshis labor by hand and in agriculture. People conduct repeated tasks at work and at home since there are no modern methods available to complete many repetitive tasks, such as lifting things or wringing clothing. Men who labor in factories and do repeated, forceful tasks run the risk of acquiring TF. A person with TF is unable to utilize their afflicted hand due to discomfort and finger joint lock. They experience agony and are unable to continue working when they grasp any things. A person's productive life will be impacted if they are limited in their activities (1). With a frequency of around 2.6% in the general population, trigger finger, also known as stenosing flexor tenosynovitis, is a major source of finger discomfort and dysfunction and a significant number of referrals to outpatient hand clinics. Narrowing of the A1 pulley sheath, which results in inflammation and nodular growth at the tendonsheath interface, is usually the etiology of the disorder. Clinically, this manifests as finger discomfort, snapping, or locking when moving, especially when bending and stretching at the proximal interphalangeal joint (2,3,4). In the general population, the incidence of TF is 28:100,000 annually, or 2.6% lifetime risk. Despite being regarded as a modest hand disease, trigger finger significantly affects everyday activities, quality of life, and hand functionality. It may be brought on by inflammation, which narrows the A1 pulley and thickens the flexor tendon, resulting in discomfort, clicking, catching, and loss of motion in the afflicted finger (5). Alphonse Notta, a French physician, initially reported the illness in four adult patients in 1850, providing preliminary information about its cause and treatment. The majority of people with trigger finger are middle-aged, healthy women. Additionally, it is linked to diseases including diabetes, gout, and rheumatoid arthritis (RA), all of which can alter connective tissue. Furthermore, trigger finger frequently co-occurs with other soft tissue conditions such carpal tunnel syndrome and DeQuervain's tenosynovitis. (6). Non-enzymatic glycosylation of collagen in the tendon and pulley is thought to be the pathophysiological connection, resulting in thickening, decreased elasticity, and heightened vulnerability to inflammation and fibrosis. The role of proliferative tenosynovitis in the disease process is further highlighted by its association with rheumatoid arthritis and other inflammatory arthropathies. Another significant etiological group consists of biomechanical and occupational stresses. Persistent force on the palmar side of the metacarpal heads (e.g., from tools like scissors or pliers), extended use of vibratory instruments, or repetitive grasping are all frequently linked to these conditions. The thumb (trigger thumb) and the ring finger are the most often used digits from a biomechanical perspective; this distribution is believed to reflect their distinct load-bearing responsibilities in power grip and precision pinch actions. (7). Because trigger thumb results in discomfort, mechanical locking, decreased thumb mobility, and poor hand function—all of which have a substantial impact on day-to-day activities and professional performance—it is clinically significant. Additionally, it is linked to systemic disorders like diabetes and rheumatoid arthritis, thus it is crucial to take underlying medical problems into account while doing an examination. Early detection and proper treatment, such as splinting, corticosteroid injection, physiotherapy, or surgical release when necessary, can alleviate symptoms, restore hand function, and avoid long-term impairment. (8).

2. ANATOMY

The flexor sheath is a membranous tissue that attaches longitudinally to the underlying bony structures and envelops the flexor tendons from the metacarpal neck to the volar plate of the distal interphalangeal joint. To allow for digital flexion, the sheath is thin where it covers the joints (cruciform pulley section) and thick over the bones (annular pulley portion). The cruciform pulleys accordion while the annular pulleys' edges approach and partially telescope at peak digital flexion. Cadaver investigations can identify the A1 pulley's surface markings, which indicate the flexor sheath's proximal boundary. The surface markings of the proximal border of the A1 pulley can be identified by measuring X cm proximally from the proximal digital crease if the distance between it and the corresponding finger's proximal interphalangeal joint crease is X cm. The length of the A1 pulley has been determined to be 1.17 cm ± 0.02 cm for the adult index, middle, and ring fingers and 0.98 cm ± 0.02 cm for the little finger (9,10). The longitudinal axis of the neurovascular bundles follows the line of the digit in the ring finger and middle finger; however, the neurovascular bundles of the index and little fingers lie in a more diagonal axis, as they are situated beyond the medial and lateral edges of the distal end of the carpal tunnel. Consequently, the neurovascular bundles for these digits may cross over the A1 pulley. A practitioner must be alert to this if invasive interventions are being considered, as the radial digital nerve to the index finger and the ulnar digital nerve to the little finger will be particularly close to the pulley, putting them at risk of inadvertent damage(11).



Biomechanics of tendon gliding: Tendon gliding is the synchronized, low-friction glide of the flexor tendon across its synovial membrane and pulley complex throughout thumb movement. Successful gliding requires on healthy tendon anatomy, an unbroken A1 pulley, appropriate synovial lubricity, and optimum tendon strain. Increasing the thickness of the tendon and A1 pulley in trigger thumb causes discomfort, clicking, catching, and locking because it increases friction and limits tendon excursion. Therefore, the main objective of both conventional and surgical therapy is to restore normal tendon gliding. (12).

EPIDEMIOLOGY:

Trigger finger is thought to affect 2-3% of people worldwide in the general population, but this number hides important differences between various clinical and demographic subgroups. Epidemiological investigations have repeatedly identified various key risk factors. Age is a significant correlate, with the highest probability occurring in people who are between their fifth and sixth decades of existence. A striking demographic disparity exists, with women being impacted two to six times more commonly than men, a characteristic presumably linked to endocrine influences on elastic tissue and ligamentous laxity. Beyond demographics, there is a strong and clinically significant correlation between trigger finger and systemic metabolic diseases. Diabetes mellitus emerges as the most important coexisting condition, with a prevalence of trigger finger in diabetic populations soaring to 10-20%, in contrast to the general population (13).

ETIOLOGY AND RISK FACTORS:

Several causes of trigger finger have been suggested, involving repetitive movements of the fingers or compressive loads at the A1 pulley and persistent local trauma. In such cases, an employment could be a major contributing factor. However the literature that is accessible merely partially validates that view. Bonnici and Spencer reported that 14/36 of their patients had professions requiring recurrent movements and Fahey and Bollinger noted that trigger finger was frequently observed in employees doing unaccustomed tasks in the work environment. However, neither Anderson and Kaye nor Trazies et al found a relationship between the occurrence of trigger finger and working conditions. (14,15).

Repetitive gripping: By creating repeated friction and mechanical stress of the flexor pollicis longus tendon as it travels through the A1 pulley, repetitive grasping leads to trigger thumb. Microtrauma, inflammation, tendon and pulley thickening, tendon sheath constriction, and eventually painful thumb locking or catching are the results of this. Chronic stenosing flexor tenosynovitis can result from prolonged repeated stress without sufficient recuperation.

Occupational exposure: The thumb is subjected to vigorous grasping, prolonged loading, repetitive action, and, in some vocations, vibration as a result of occupational exposure. The flexor pollicis longus tendon and A1 pulley sustain cumulative microtrauma from these mechanical forces, which results in inflammation, fibrosis, pulley constriction, and decreased tendon gliding. Over time, this causes trigger thumb to become painful, click, and lock.

Systemic diseases and inflametory disorders: Chronic inflammation, fibrosis, collagen glycation, tissue swelling, and aberrant material deposition inside tendons and tendon sheaths are all ways that systemic illnesses produce trigger thumb. These pathological alterations diminish tendon-gliding space, thicken the flexor tendon and A1 pulley, and eventually cause the discomfort, catching, and locking associated with trigger thumb. The most often linked systemic illness is diabetes mellitus, which is followed by amyloidosis, rheumatoid arthritis, hypothyroidism, gout, and chronic renal disease.

Degenerative changes: Trigger thumb is caused by degenerative alterations that gradually modify the structure of the A1 pulley and the flexor pollicis longus tendon. Collagen deterioration, fibrosis, tendon thickening, and pulley constriction are caused by aging and prolonged wear. Increased friction, uncomfortable catching, clicking, and ultimately thumb locking are the results of these alterations that hinder proper tendon gliding. Trigger thumb is a complex illness since degeneration frequently coexists with systemic disorders and recurrent mechanical strain.

Genetic predisposition: By affecting collagen chemistry, connective tissue resilience, inflammatory reactions, and tendon repair, genetic factors have a role in trigger thumb. Smooth tendon gliding may be hampered by several hereditary traits, which can cause fibrosis, tendon becoming thicker, and A1 pulley constriction. Although trigger thumb is seldom caused by genetics alone, it does enhance a person's vulnerability and combine with age, mechanical stress, and systemic disorders to accelerate the condition's development. (16).

PATHOPHYSIOLOGY:

Histopathologically, trigger thumb, which mostly affects the A1 pulley, is characterized by fibrocartilaginous metaplasia, collagen disarray, fibrosis, extracellular matrix buildup, tendon degeneration, and little inflammation. In addition to impairing tendon gliding and narrowing the tendon canal, these long-term degenerative alterations cause the typical symptoms of discomfort, clicking, catching, and locking. The current idea that trigger thumb is a fibroproliferative stenosing condition rather than a simply inflammatory tenosynovitis is supported by these histological findings. At the level of the metacarpal head, a difference in the diameter of the flexor tendon and its sheath causes trigger finger. During tight grasp and maximum flexion, the proximal edge of the A1 pulley experiences high pressures. The rest of the pulley system has a more uniform distribution of pressure. This appears to have a negative impact on certain individuals, changing the A1 pulley's macroscopic appearance with fibrocartilaginous metaplasia and hypertrophy at the tendon-pulley contact. (17). The flexors are typically strong enough to overcome this obstruction, while the weaker extensors are less able to counteract the block, resulting in the finger being locked in flexion. The thickening of the sheath, along with some localized tendon thickening, can result in a confined tunnel for tendon excursion and eventually give rise to an obstruction to movement. Due to the large local stresses and strong corresponding pressure gradient, the A1 pulley is the location of greatest tendon excursion in almost all instances. There have been reports of other tendon triggering locations, such as the palmar aponeurosis and the A2 and A3 pulleys. (18).

CLINICAL PRESENTATION:

When the affected digits are moved, trigger finger causes pain and discomfort in the palm. When the patient flexes and extends the digit, the flexor tendon gradually or sometimes suddenly produces a painful click. A finger that is locked in a specific position—typically flexion—may need to be gently passively manipulated into full extension when the patient first arrives. After functional restrictions were determined, tender nodules were seen on the A1 band. Individuals with trigger thumb may experience sudden relief of symptoms such as morning stiffness. The disorder has a lifetime risk of 2.6% in the general population and a reported incidence of 28 instances per 100,000 people annually. In those with diabetes, this increases to 10%. There are two occurrence peaks: the first occurs before the age of eight, and the second, more frequent, occurs in the fifth and sixth decades of life. In terms of age, incidence, sex distribution, digit affected, therapy, and outcome, this bimodal distribution reflects two distinct clinical groups. (19).

3. DIAGNOSIS

The primary method for diagnosing trigger thumb is still clinical examination. Accurate diagnosis, severity grading, and treatment planning are made possible by a methodical evaluation that includes a history, inspection, palpation of the A1 pulley, range of motion, triggering assessment, grip and pinch strength, functional evaluation, and application of the Quinnell Classification. Timely management and improved functional results are made possible by early detection through meticulous clinical assessment. Trigger finger is still predominantly diagnosed clinically, based on a thorough physical examination and patient history. A palpable nodule, a repeatable catching or locking that gives the syndrome its name, and discomfort to palpation over the A1 pulley at the palmar base of the afflicted finger are important findings. A grading system that ranges from Grade I (pain and history of catching but no visible locking) to Grade IV (a permanent flexion contracture that cannot be passively straightened) is frequently used by clinicians. Based on severity, chronicity, and patient response, the therapeutic paradigm for trigger finger is phased, moving from conservative to surgical procedures (20). The patient's description of the painful snapping or locking of the afflicted finger during flexion and extension is the main factor used to diagnose trigger finger. Asking the patient to open and close their hand during a physical examination can confirm this. There may be tenderness and occasionally a palpable nodule at the base of the finger. In most cases, imaging is not necessary for diagnosis. (21). Clinicians may find that the A1 pulley is noticeably thicker and stiffer than normal controls by using ultrasonography. Clinicians can make a diagnosis based on clinical symptoms, and the diagnostic trigger finger is rather straightforward (22). When comparing the thickness and the afflicted sheath to the control or normal sheath, ultrasound is helpful and has been shown to be just as accurate as manual measurements made after surgery. The degree of thickness and the severity of the illness may be correlated using ultrasound (23).

CONSERVATIVE MANAGEMENT

Activity modification, splinting (especially night splinting to keep the metacarpophalangeal joint in extension), and oral anti-inflammatory drugs are usually part of the first therapy. However, the local corticosteroid injection into the tendon sheath is the mainstay of non-surgical therapy. In non-diabetic, idiopathic instances, this technique has been shown to have success rates ranging from 50% to over 90% in reducing the inflammatory thickening of the tendon and pulley. However, recurrence is not unusual, particularly in those with diabetes or those whose symptoms have persisted for a long time. Surgical A1 pulley release provides a final option for individuals who come with a fixed contracture or who do not respond to one or two injections. With success rates surpassing 95% and a minimal risk of complications, this simple surgery can be carried either percutaneously or by a tiny open incision (24).The literature has extensively documented the advantages of conservative therapy for trigger finger management. Orthoses, corticosteroid injections, and physical therapy are examples of conservative treatment approaches. Success rates (i.e., lack of pain and triggering) with physical therapy care of trigger finger has been recorded as 69%, with low recurrence rates (25).

Patient Education: A key component of conservative trigger thumb treatment is patient education. By knowing the situation problem, adjusting activities, implementing ergonomically advice, keeping to splinting and exercise regimens, and identifying warning signs, patients can considerably minimize symptoms, enhance thumb function, and decrease the likelihood of relapse. When coupled with physiotherapy and similar conservative therapies, patient awareness helps to positive, long-term outcomes. Exercise training encompassed self-applied deep tendinous frictions, passive lengthening of the flexor appliance, and active assisted flexion and extension of the concerned digits, with self-applied manipulation of the nodule via the respective pulleys. The pathophysiology and characterization of trigger finger, symptom treatment, and activity modification advice, including avoiding aggravating variables, were all explained to the patient. The control of symptom relapse was discussed, and the treatment strategy and procedure were examined. When triggering happened at the A2 or A3 pulley, it was advised to use the Oval8 splint to retain the afflicted finger in the extended position. Patients were advised to wear the splint 60–80% of the time. (26).

Activity Modification: One of the most successful conservative methods for treating trigger thumb is activity moderation. Patients can lessen mechanical load on the flexor tendon and A1 pulley by avoiding strong grasping, decreasing repeated thumb motions, employing ergonomic approaches, taking frequent rest periods, and gradually resuming to normal activities. Activity modification aids in healing, restoring thumb function, and preventing relapse when paired with splinting, tendon-gliding exercises, and physiotherapy.

Splinting: Metacarpophalangeal joint preventing orthoses (MCP-BO), proximal interphalangeal joint preventing orthoses (PIPBO), distal interphalangeal joint inhibiting orthoses (DIP-BO), and relative movement extension orthoses (RME-O) are among the several splint kinds used to treat trigger finger. The effectiveness of each kind in lowering pain and enhancing function varies (27). Another conservative method is splinting, which tries to reduce tendon mobility through the pulley system. Splinting may provide superior short-term relief, according to studies, with rates of effectiveness as high as 87% over a year in certain situations after 6–9 weeks of therapy. (28).

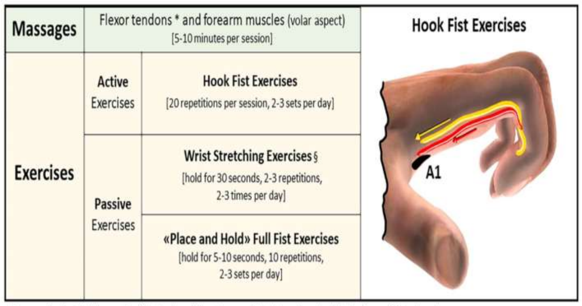
Physiotherapy

Tendon-gliding exercises: A safe, easy, and successful part of conservative treatment for trigger thumb is tendon gliding exercises. They improve thumb mobility and hand function while reducing discomfort, stiffness, and triggering by encouraging the flexor pollicis longus tendon to flow smoothly via the A1 pulley. The best likelihood of a successful non-surgical recovery is achieved by consistent performance in conjunction with splinting, lifestyle modification, and incremental strengthening.

Stretching: An essential component of conservative trigger thumb rehab is stretching. They support the adaptability of the thumb muscles, joint capsule, flexor pollicis longus (FPL) tendon, and adjacent soft tissues. Stretching may broaden thumb range of motion, promote tendon gliding, lessen stiffness, and restore healthy function of the hand when done carefully. Stretching is best done within a pain-free range after the hand has been warmed for five to ten minutes with hot water or a warm towel.

Manual therapy: Manual treatment intended to resolve joints limited secondary to tendon and/ or sheath contracture. This comprised passive accessory and passive physiological mobilizations and passive stretching of the digits to lengthen flexor tendon and/or sheath restrictions subsequent to the nodule. Furthermore, both proximally by means of the pulley in conjunction with compound flexion of the digit and distally via the pulley combined with composite extension of the digit, deep tendinous tensions, and passive soft tissue adjustment of the nodule were employed (29, 30). The fundamentals of rehabilitation care include passive stretching of the flexor tendons and joint capsules, active tendon gliding activities, and manual therapy with massages of the flexor tendons to soften them and forearm muscles to lessen the painful contractures. By allowing a differential glide between the superficial and deep flexor tendon (of 10–11 mm), the hook fist exercises prevent the A1 pulley from being overworked. A full extension of the affected finger is noteworthy. It is crucial to maximize the tendons' gliding throughout the exercise while preventing the PIP joint's capsular shortening. The fingers are bent to form a hook while maintaining a straight palm and knuckles. encourages the vascular/lymphatic drainage of congested soft tissues, the rebuilding of scar tissue between the two tendons (FDS and FDP), and the circulation of synovial fluid inside the tendon sheath. Similarly, mild "place-and-hold" fullfist workouts guarantee MCP flexion without increasing the A1 pulley's mechanical strain. In this way, the patient's normal hand is used to manually flex the afflicted finger until it reaches a full fist posture. The flexed position is then kept for five to ten seconds before the fist is released once again utilizing the unaffected hand(31, 32, 33).

Grip & Pinch strengthening: After trigger thumb discomfort and triggering are under control, grip and pinch endurance are crucial elements of rehabilitation. Exercises should emphasize proper approach and avoid provoking symptoms, starting with modest intensity and progressing gradually. These strengthening exercises assist restore hand function, enhance thumb performance, and enable a safe return to daily activities when combined with tendon-gliding exercises, splinting (if necessary), activity adjustment, and patient instruction.



* perpendicular to the long-axis of the tendons, § bend your wrist backwards and hold using the unaffected hand
[massage and exercise sets based on the author's experience]

Home exercise programme: One important component of conservative trigger thumb therapy is an exercise regimen at home. In addition to activity restriction and splinting when necessary, daily tendon-gliding, range-of-motion, stretching, and progressive strengthening exercises can enhance thumb function, lessen discomfort, and lower the chance of recurrence. If symptoms increase, chronic locking occurs, or there is no noticeable difference after several weeks of regular therapy, patients should progressively advance their exercises and seek reevaluation.

Physical Modalities

Therapeutic ultrasound: The standardized configuration for remedial ultrasounds in patients with TF has been suggested to be a pulse mode of 1w/cm2 across the flexor tendons. A popular and safe supplementary physiotherapy technique for trigger thumb is therapeutic ultrasonography. Its heat and non-thermal properties may enhance tendon gliding, boost tissue extensibility, lessen pain and inflammation, and aid in healing. T-US should be utilized as part of a thorough rehabilitation regimen rather than as a stand-alone intervention, even if it can help with symptom alleviation and increased function. If symptoms persist after conservative treatment, corticosteroid injection or surgical release should be considered (34).

Low-level laser therapy: Low-Level Laser Treatment is a safe, non-invasive supplementary procedure for a trigger thumb that aims to alleviate pain and inflammation, promote tissue healing, enhance tendon gliding, and regain thumb function. While it could offer symptomatic relief—particularly when integrated into a comprehensive physiotherapy approach—the current research does not support its use as a solitary definitive treatment. Patients with prolonged or severe symptoms should be assessed for other conservative options, corticosteroid injection, or surgical relief when appropriate. Low-Level Laser Therapy (LLLT) is the administration of low-power monochromatic or near-monochromatic light (usually 5–500 mW) to biological tissues in order in order to encourage healing, decrease inflammation, and minimize pain by means of photobiomodulation.

Extracorporeal shockwave therapy (ESWT): ESWT has gained popularity recently as a surgical substitute for treating tendinopathies in patients who are not responding to conventional conservative therapy. Although the biological mechanisms by which ESWT produces therapeutic impacts on pathological tendon tissue are not fully understood, the following hypotheses regarding how shockwaves may aid in the recovery process have been put forth:

stimulating growth factors release and stem cell recruitment; facilitating catabolic processes with the interference and elimination of dysfunctional matrix tissues; triggering neoangiogenesis by means of a rise in angiotensin factor, which provides the affected tendon the bloody supply required for its repair; and stimulating the synthesis of nitric oxide, which will slow the development of inflammation (35, 36).

Heat therapy: The swollen tendon or pulley may be made more elastic and extensible by applying heat locally. Hot packs, hot wax, and paraffin baths are examples of superficial thermal modalities (depths of 2–3 cm); ultrasonic treatment and diathermy are examples of deep heat modalities (depths of up to 5 cm) (37).

Cryotherapy: Applying a cold pack on the afflicted finger for 10 to 15 minutes, two to four times a day, can help individuals with acute tenosynovitis experience less discomfort, tenderness, and localized inflammation.

Dry needling: Physical therapists are using a relatively novel approach called dry needling (DN) to treat different pain syndromes and myofascial trigger points (MTrPs). In order to control pain and enhance function, dry needling involves inserting fine monofilament needles, similar to those used in acupuncture, into muscles, ligaments, tendons, subcutaneous tissue, and scars (38).

Corticosteroid Injection: The CSI is recommended for patients whose medical conditions have not improved after four to six weeks of conservative therapy; in fact, the corticosteroid (triamcinolone acetonide) works better than placebo injections with 0.9% NaCl. It is believed that corticosteroids function by decreasing soft tissue edema, which restores flexor tendon mobility. In a 2008 randomized controlled study including 72 patients with TF, triamcinolone seems to be more efficacious than dexamethasone at 6 weeks; however, this benefit is lost by 3 months (39,40).

SURGICAL MANAGEMENT

Patients with repeated triggering, a locked thumb, or persistent symptoms following conservative treatment are the only ones eligible for surgical treatment of trigger thumb. Because it offers direct vision, exceptional safety, and long-term success rates that above 95%, open A1 pulley release is regarded as the gold standard technique. In order to minimize stiffness and enable a quick return to everyday activities, early postoperative mobilization in conjunction with physiotherapy that focuses on range of motion, tendon gliding, swelling control, scar rehabilitation, and stability assists in regaining normal thumb function.

4. OUTCOME MEASURES

Functional Dexterity Test (FDT): The FDT tool is appropriate for adults with a range of upper limb injuries, aged 20 to 70. The FDT provides information on the clients' hand-eye coordination for functional tasks that call for a dynamic three-jaw chuck grip pattern. It is constructed from a wooden pegboard that is square and has sixteen pegs. The time needed to flip over each peg is recorded by the examiner. Each hand's execution time is measured independently. Every time a player supinates or hits the board, they are penalized for five seconds; if they drop a peg, they are penalized for ten seconds. For every hand, two scores are obtained: the total score (net time + penalties) and the net time in seconds. The net time score was used in the present study. The FDT was found to have good interrater and good test retest reliability(41).

Purdue Pegboard Test (PPT): The PPT was created in 1948 to evaluate candidates' manual dexterity and accuracy for industrial jobs. The PPT has been employed in investigations and rehabilitation ever since. In the first three of the PPT's four subtests, participants are given 30 seconds to insert as many metal pins as possible, one at a time, into a row of pegboard holes using their dominant hand first, then their nondominant hand, and finally, pairs of pins using both hands at the same time. The fourth and final subtest requires the individual to build as many assemblies as possible—a pin, washer, collar, and second washer—in 60 seconds using alternating hands. The PPT tests the quality and speed of performance of the hand as the person accomplishes the four subtests(42).

Jamar Hydraulic Hand Dynamometer (JD): The JD is said to be the most accurate test for gross power fist grip. This instrument was suggested by the American Society of Hand Therapists (ASHT) for grip strength evaluation. The ASHT's rules were followed when administering the exam. Psychometric evaluation revealed strong test-retest dependability and good indoor dependability (43).

VAS/NPRS: The 11-degree of determination of verbal questions through visual analogue scale or as the Numerical Pain Rating Scale (NRS), measures an individual's subjective level of pain over the course of the previous day or week. A visual scale or a verbal scale can be used to deliver the pain scale (44).

QuickDASH / DASH: The DASH was created to track changes in symptoms and function over time and to characterize the impairment encountered by individuals with upper-limb diseases. Thirty questions about various symptoms, social function, and physical function make up the questionnaire. There are five possible answers for each item. A scale score between 0 (nodisability) and 100 (most severe disability) is then computed using the results for each item. There are two more sections with four questions that are pertinent to those who work, play music, or participate in sports (45).

Michigan Hand Outcomes Questionnaire: A thorough, trustworthy, and established patient-reported outcome measure for evaluating pain, hand function, activities of daily living, job performance, aesthetics, and patient satisfaction is the Michigan Hand Outcomes Questionnaire (MHQ). It offers a thorough assessment of the functional effect of trigger thumb in patients and is useful for tracking healing after conservative physical therapy, corticosteroid injections, or surgery. It is a great tool for both clinical treatment and research because to its outstanding psychometric qualities.

Quinnell grading: The clinical severity of TF is evaluated using the Quinnell grading system. This categorization assigns the following ratings to TF fingers: 0 for normal movement, 1 for unequal movement, 2 for voluntarily correctable digit locking, 3 for passively correctible locking, and 4 for fixed deformity (46).

5. CONCLUSION

Due to stenosis of the A1 pulley and poor gliding of the flexor pollicis longus tendon, trigger thumb (stenosing flexor tenosynovitis) is a common hand condition marked by thumb discomfort, clicking, and locking. To reduce symptoms, restore thumb function, and avoid long-term impairment, early diagnosis and adequate treatment are crucial. For the majority of patients, conservative management—which involves educating the patient, lifestyle modification, thumb splinting, therapeutic exercises (range-of-motion, stretching, tendon-gliding, grip and pinch strengthening), and adjunctive physiotherapy modalities like Low-Level Laser Therapy (LLLT)/Photobiomodulation and Therapeutic Ultrasound (T-US)—remains the first line of treatment. These treatments seek to increase tendon mobility, promote tissue repair, lessen pain and inflammation, and regain normal hand usage. While T-US and LLLT may alleviate symptoms, they work best when combined with other therapies in an all-encompassing rehabilitation program. Corticosteroid injections or surgical release of the A1 pulley may be beneficial for patients who do not progress with conservative therapy, have severe functional impairment, or have chronic locking. High success rates and a low incidence of recurrence are associated with surgical therapy, especially open A1 pulley release, which consistently restores smooth tendon gliding. All things considered, the best chance for pain relief, thumb function restoration, return to daily activities, and long-term relapse aversion is provided by a multidisciplinary, patient-centered strategy that incorporates evidence-based physiotherapy, suitable medical or surgical treatment when necessary, and a structured home exercise program.

Limitation & future directions: This research has a number of shortcomings despite the insightful information it offered. The findings may not be as generalizable to other healthcare professionals working in hand rehabilitation because the study material was very short and mostly consisted of a few papers and pieces of evidence. Furthermore, patient outcomes were not included in the study, which only used clinician-reported practices. The limits include the variety of approaches and distinct applications, particularly on TF. Larger and more varied studies, longitudinal studies, evidence-based management, and frequent trials of patient-centered outcomes should all be used in future research to overcome these shortcomings. These methods would help the creation of more specialized and efficient treatment plans and bolster the body of data supporting conservative care of trigger finger.

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