



**BRIGHAM & WOMEN'S HOSPITAL**  
Department of Rehabilitation Services  
Physical Therapy

Standard of Care: de Quervain's Syndrome: Surgical Management  
Physical Therapy management of the patient who had a release of the first extensor compartment.

**Case Type/Diagnosis:** (diagnosis specific, impairment/dysfunction specific)

Since the first description of “washerwoman’s sprain”<sup>11</sup> tenosynovitis of the first dorsal compartment has become a commonly recognized inflammatory disorder. The most radial of the extensor compartments on the dorsum of the wrist is occupied by the tendons of the extensor pollicis brevis and abductor pollicis longus. The tendons are enveloped in an osseofibrous canal lined by synovium, which, when subjected to excessive or repetitive mechanical stresses, responds in a characteristic fashion distinguished by pain, swelling, and limitation of motion of the thumb. In 1895, Fritz de Quervain, a Swiss surgeon,<sup>1</sup> was first credited with the recognition of this disease and so it bore his name. More accurately, Tillaux<sup>2</sup> and Gray<sup>3</sup> referred to this disorder before de Quervain.

**Anatomy:**

Twenty-four extrinsic tendons cross the wrist and provide power and dexterity in the hand. Each tendon passes through a series of tight fibrous -osseous canals designed to optimize the balance between motion and force production by maintaining the tendon in close approximation to the joint or joints it controls. There are six separate compartments under the dorsal carpal ligament each lined with a separate synovial sheath membrane. The first one is over the radial styloid and it contains the abductor pollicis longus and the extensor pollicis brevis tendons. These tendons pass through an unyielding osteoligamentous tunnel formed by a shallow groove in the radial styloid process and a tough overlying roof composed by the transverse fibers of the dorsal ligament. This fibrous tunnel is about 2 cm long, whereas the synovial sheath extends from each musculotendinous junction proximal to the tendon insertions well beyond the tunnel itself. Division or rupture of a critical retinacular ligament or pulley, will allow the tendon to drift away from the joint’s center of rotation and therefore increase the moment arm for force production but also lengthens the tendon which limits the excursion of the joint<sup>21</sup>

**ICD9: 727.05**

**Causes of de Quervain’s Syndrome and Demographics:**

The three most common causes of stenosing tenovaginitis appear to stem from repeated active contraction of the muscle moving the tendon, and direct injury.<sup>13</sup> Tenovaginitis is noted to be more common in women than men. Lapidus<sup>5</sup> reports female/male ratio of 4:1. Occupational factors may play a role and tendonopathies tend to cluster in some

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individuals. Often multiple conditions already exist such as carpal tunnel syndrome, trigger fingers, lateral epicondylitis and rotator cuff disease. Medl<sup>6</sup> echoes these concerns of those with painful hands outnumber the male patients two to one. Housewives, especially those with small babies, lead in being afflicted by de Quervain's syndrome. Workers who use their hands continuously on various business machines are also susceptible. Recently, Armstrong et al.<sup>21</sup> stated the risk of hand and wrist tendonopathy in persons who perform highly repetitive or forceful jobs is 29 times greater according to epidemiologic data. It showed that assemblers, musicians, and meat cutters are often developing the disease.

### **Symptom Presentation:**

De Quervain's syndrome includes pain and swelling localized to the area of the radial styloid. Pain is especially aggravated by ulnar deviation of the wrist by flexion and adduction of the thumb or by simple adduction of the thumb.<sup>1</sup> Pain may also cause weakness with diminished grip and pinch strengths. Swelling is often seen especially in chronic cases.<sup>4</sup>

### **Mechanism of Injury, Chief Complaint:**

Cumulative micro-trauma may be caused by forceful, sustained or repetitive thumb abduction and simultaneous wrist ulnar deviation.<sup>4</sup> Opening jars, wringing the hands, cutting with scissors, holding surgical retractors, playing the piano, and doing needlepoint are a few examples of activities that may provoke de Quervain's syndrome.<sup>7 8 9 10 11</sup> The chief complaints usually are pain, weakness, swelling along the radial side of the wrist during these activities.

### **Examination:**

### **Medical History:**

Assessment begins with a thorough history, including exploration of aggravating activities and associated conditions that may have predisposed the patient to tendonopathies. The pain, which is usually localized, can be provoked with direct pressure, stretch, or resistance to the affected tendons.<sup>6</sup> Occupational factors may play a role but tendonopathies tend to cluster in some individuals.<sup>4</sup> If the patient has had surgery to decompress the first extensor compartment this op-report needs to be reviewed. Also any previous surgeries in the area such as a trigger finger release or a carpal tunnel release needs to be discussed and documented.

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The clinician should carefully review a patient's medical history questionnaire (on an ambulatory evaluation), patient's medical record, and medical history reported in the hospital's computerized medical record. Careful consideration should be made to identify any traumatic history to the affected extremity, rheumatoid illnesses, diabetes or other metabolic disorders. Finally, the clinician should review any diagnostic testing and imaging.

Upon examination, tenderness is elicited over the first dorsal compartment. This tenderness may be worsened in the presence of inflammation involving the superficial radial nerve. Excruciating pain in the region of the radial styloid is common.<sup>4</sup> Discomfort also may be found with resisted thumb extension at the metacarpalphalangeal joint which is indicative of a positive "hitch-hiker's" test.<sup>2</sup> Other causes of the pain need to be eliminated. A useful test was proposed by Finklestein<sup>14</sup> in 1930 and is found to be positive in nearly all patients with de Quervain's syndrome. The thumb is held in full flexion - adduction and the wrist is abruptly deviated in an ulnar direction. Excruciating pain in the area of the radial styloid points to this diagnosis.<sup>21</sup>

Radiographic examination is usually unremarkable. Localized osteopenia in the radial styloid may be noted.<sup>21</sup> Calcifications in the area of the first dorsal compartment may be identified, especially in chronic cases. Basal joint arthritis may be painful with thumb motion and may demonstrate a positive Finklestein test. It usually can be distinguished from de Quervain's syndrome by a positive axial compression test<sup>16</sup> and the absence of the first dorsal compartment tenderness to palpation. The two may coexist.<sup>21</sup>

### **History of Present Illness:**

It is important to obtain a detailed history of the patient's job requirements and activities to reveal any useful information that may be helpful to the objective clinical examination.

Specifically, it is important to determine if there are occupational activities that the patient is performing that require significant grip force and/or prolonged static or repetitive positioning in elbow extension in conjunction with supination or pronation. The clinician should obtain information on the timeline of onset and development of the symptoms and identify provocative vs. relieving activities<sup>4</sup>

### **Medications**

Any current medications and post-operative medications need to be identified. Postoperatively patient will be prescribed pain mediation by their surgeon. Depending on the dosage these medications may interfere with the comprehension of any instructions so

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a family member is advised to accompany the patient to therapy and to be present for the entire session.

### **Social History**

A review of the patient's home, work and recreational activities will give the therapist insight into the patient's activity level and emotional support at home/work.

The support may be needed if the patient experiences unusual intense pain and swelling and need assistance with activities of daily living following surgery.

### **Surgical Intervention**

Surgical release of the first dorsal compartment is indicated after failed conservative management. In general surgery includes the release of constricting fibrous pulleys, and in some systemic conditions, excision of hypertrophied tenosynovium.<sup>4</sup> The procedure is usually performed with only local infiltration anesthesia. A pneumatic tourniquet around the forearm is well tolerated for the short duration of the procedure, and is a bloodless surgical field is essential for the identification of radial sensory branches, as well as the anatomic variations. A 2-cm transverse skin incision is made over the first dorsal compartment about 1 cm proximal to the tip of the radial styloid process. Care is taken to identify and gently retract the one to three radial sensory branches that cross the compartment obliquely by using gentle, blunt longitudinal dissection as soon as the deepest dermal layer of skin has been incised.<sup>23</sup>

Burton and Littler recommended incising the sheath on its most dorsal margin and leaving a flap of palmar sheath to prevent subluxation.<sup>21 22</sup> Although the particular site of sheath incision is disputed<sup>28</sup> all authors agree that a thorough exploration for separate compartments must be performed, with complete division of all intervening septa and identification of each tendon slip. Usually thick septa can be excised entirely. If the tenosynovial tissue is thick and opaque, surgical debulking is performed. The tendons are lifted by hook or blunt retractors out of the tunnel to ensure complete decompression from their musculotendinous junctions to a point at least 1cm distal to the retinacular sheath. The tendons are replaced and the patient moves the thumb to demonstrate free and independent movement of the long abductor and the short extensor. Hemostasis is established with cautery after tourniquet release and the skin is closed with a single intradermal monofilament pullout suture and adhesive bandages. A soft bulky dressing is applied to minimize motion of the thumb during the initial 2 to 3 post-operative days. Thereafter the patient may begin to resume use of the thumb and wrist as tolerated.<sup>23</sup>

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### **Potential Complications:**

The most serious complication of this operation follows iatrogenic injury to a superficial sensory branch of the radial nerve with the subsequent formation of a painful neuroma. Overly vigorous retraction of a radial nerve branch without apparent injury may occur. Most authors advocate immediate nerve reapproximation by appropriate microsurgical techniques to reduce likelihood of neuroma formation and minimize hypoesthesia in the thumb and index finger.<sup>24</sup> Incomplete relief of pain following release of the first dorsal compartment, especially among working women is not uncommon. Associated diagnoses, including painful CMC joint arthritis, are very common and may be confirmed with a diagnostic lidocaine injection to the suspected area.<sup>4</sup>

Hypertrophic or painful longitudinal scars may be modified by Z-plasty.<sup>23</sup> For the rare patient with painful palmar subluxation of the tendons following release, pulley reconstruction with a slip of extensor retinaculum<sup>25</sup> or a distally based slip of the brachioradialis<sup>28</sup> has been described.

### **Postoperative Management**

The hand is maintained in a soft bulky dressing for the first 2 to 3 days. A forearm-based thumb spica splint is then applied during the first 2 weeks to control postoperative pain and swelling. Gentle active ROM and tendon gliding should be initiated in the first few days postoperatively. The goal is full, pain-free excursion of the APB and EPB approximating Finkelstein's test position. Grip and pinch strengthening exercises may begin at approximately 3 weeks and can be progressed gradually. By six weeks the patient usually is able to resume full activities.<sup>4</sup>

### **Precautions for Treatment:**

1. Severe pain (> 8/10 on the pain analog scale) and inflammation along the radial sensory nerve or of the first extensor compartment.
2. Loss of thumb active motion and inability to oppose the index and long digits.
3. Severe swelling of the dorsal first extensor compartment of the wrist.
4. Inability to follow directions or carry through with written instructions for the home or occupational environment.
5. The referring physician should be contacted if there are any unusual symptoms or if patient does not respond to treatment.

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**Examination** (physical/cognitive/ applicable tests and measures/other)

This section is intended to capture the minimum data set and identify specific circumstance(s) that might require additional tests and measures.

### **Physical Examination/ Evaluation**

**Pain: As measured on the VAS (Visual Analog Scale)**

1. Pain- Place
2. Amount – Pain level VAS (0-10)
3. Intensifiers
4. Nullifiers
5. Effect on function
6. Descriptors (i.e. sharp, dull, constant, throbbing. etc)

### **Sensation:**

Sensation is usually normal but may be hypersensitive to touch due to the amount of inflammation within the first dorsal compartment. Post operatively the radial sensory branch may be inflamed due to decompression of the first extensor compartment and soft tissue disruption.

### **Edema:**

Measurements of the involved wrist can be taken and compared to the non-involved wrist either with a tape measure or by the volumetric water displacement method. The distal wrist crease is the focal point for the circumferential measurement of the wrist using a tape measure as compared to the non-involved wrist. Swelling may be significant post operatively due to the normal inflammatory response to the surgery.

### **Active and Passive Range of Motion (A/PROM):**

Measure bilateral (B) upper extremity (UE) range of motion, (elbow, forearm, wrist, thumb, and digits) noting limitations in range due to pain or weakness.

Post operatively, for mild to moderate complaints of pain, due to the surgical decompression of the first extensor compartment, the thumb and wrist may show limited active range of motion.

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The active range of motion usually recovers quickly depending on the pain and swelling present. Some complaints of discomfort may be present when patient begins a gentle strengthening program. Pain control techniques may be incorporated as needed.

### **MMT/Strength testing**

A manual muscle test is not appropriate until the patient is ready for resistive strengthening exercises, which is at 4 to 6 weeks post -op.

The abductor pollicis longus originates from the posterior surface of the body of the ulna, distal to the origin of the supinator, interosseus membrane, and posterior surface of the middle one third of the body of the radius. The insertions are at the base of the first metacarpal bone along the radial side. The extensor pollicis brevis originates along the posterior border of the radius distal to the origin of the abductor pollicis longus and interosseus membrane. It inserts at the base of the proximal phalanx of the thumb, dorsal surface.

You test by putting pressure against the lateral surface of the distal end of the first metacarpal in the direction of adduction and weakness is demonstrated by the inability to abduct the first metacarpal and the inability to abduct the wrist.

**Strength** may be measured at 4 to 6 weeks depending on the sensitivity level post-op. Due to its reliability, the Jamar dynamometer may be used to assess the grip strength with the average of three tries and be compared to the non-involved extremity. A 30 pound pinch meter may be used to assess key and tip pinch with the average of three tries.

**Functional Assessment:** The use of a specific functional capacity questionnaire is recommended to establish current functional deficits, assist in establishing goals, and to track progress.

### **Possible tools:**

- 1. Michigan Hand Questionnaire**
- 2. Manual Ability Measure**

### **Acute (Inpatient if applicable)**

As Above

### **Sub Acute (Outpatient if Applicable)**

As Above

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**Establish Diagnosis and Need for Skilled Services:**

Patients diagnosed with de Quervain's syndrome, and who have had surgery, may have pain and swelling with decreased use of the affected extremity.

**Potential Problem List:** (Identify Impairments (s) and/or dysfunction:

1. Excess Pain to affected hand and wrist
2. Declined pinch and grip strength of affected hand
3. Declined endurance of affected hand and wrist for repetitive work
4. Declined functional use of affected hand for ADL tasks.
5. Declined knowledge for proper positioning techniques, ergonomics and joint protective measures during activities of daily living and work.

**Prognosis**

Good, if patient makes adjustments to his/her environment and adheres to proper body mechanics at work and/or in the home.

**Goals of Rehabilitation following de Quervain's release:**

1. At the initial post-op visit, the patient will be fit to a long opponens splint for rest and protection of the surgical site.
2. Goals will include control of post-op swelling, sensitivity, and scar management and the patient will be independent in self-care.
3. The patient will be provided a written home exercise program when appropriate and the patient will demonstrate the exercises correctly.
4. Improve functional use of the involved wrist to pre-morbid level in six weeks.
5. Provide a strengthening program as tolerated by the patient.

**Age/Other Specific Considerations:**

Women who are pregnant or new mothers caring for their babies are at a high risk of developing DeQuervain's syndrome Other susceptible are those who do repetitive pinch or gripping or twisting activity on the job or at home. Adaptation of these jobs may be necessary to prevent this inflammatory response and development of DeQuervain's syndrome.

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**Treatment Planning / Interventions:**

Established Pathway                      \_\_\_\_\_ Yes see attached                      \_\_X\_\_No

Established Protocol                      \_\_\_\_\_Yes see attached                      \_\_X\_\_No

**Modalities**

Modalities such as ultrasound, fluidotherapy, superficial heat, or cryotherapy have been used in the postoperative treatment of de Quervain's release. It should be noted however, that there are inconclusive findings to support or refute the benefits of these modalities. Please refer to specific BWH Rehabilitation modality standards of care for general information on each modality.

**Splinting**

Splinting is used for the first two to three weeks depending on the amount of sensitivity following surgical release. See splinting parameters as above.

**Strengthening Exercises:**

Strengthening exercises can be initiated when painful symptoms have subsided. Graded symptom-free exercises have been shown to increase metabolism, speed repair and prepare the patient to meet the physical demands of daily activities.<sup>4</sup> Resistive exercises may be done in the isometric, isotonic, or isokinetic modes depending on patient's tolerance.<sup>4</sup> Putty, free weights, and theraband are practical for home use.

**Frequency & Duration:**

The patient will be seen one to two times per week depending on the level of pain and dysfunction. The average duration is for six to eight weeks or as indicated by the patient's status and progression.

**Patient/Family Education:**

1. Provide a home program with verbal and written instructions.

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2. Review ergonomics, body mechanics, adaptive equipment and adaptations as needed during activities of daily living.
3. Provide splint don/doff instructions, wearing schedule and hygiene.
4. Review the basic anatomy and offer educational material on the diagnosis.

### **Recommendations and Referrals to Other Providers:**

Patient may be referred back to referring surgeon if complications arise.

### **Re-evaluation/assessment:**

Standard time frame for treatment is 4 to 8 weeks with re-evaluation in 4 weeks. Goals will be reassessed monthly and a progress report sent to the referring surgeon every thirty days.

### **Discharge Planning:**

Commonly expected outcomes at discharge: Full resumption of pre-morbid activities and work with awareness of ergonomics, joint protection and proper positioning techniques. Patient's discharge instructions: Continued awareness of correct positioning techniques, ergonomics and continuation of the home exercise program.

### **Transfer of Care (if applicable):**

Should painful symptoms persist and /or increase, the patient will be referred back to the PCP or specialist who referred patient to therapy.

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