

## REVIEW ARTICLE

# COMMON ORTHOPEDIC HAND AND WRIST DIAGNOSES ENCOUNTERED IN THE PRIMARY CARE SETTING

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## KEYWORDS

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## ABSTRACT

Primary care physicians are crucial in diagnosing and managing hand and wrist pain. As the first point of contact for patients, primary care physicians develop individualized treatment plans, which may involve prescribing medications, recommending physical therapy, providing joint injections, or referring patients to appropriate specialists. By coordinating care and closely monitoring patients' progress, primary care physicians play a vital role in improving patients' quality of life and ensuring appropriate referrals and interventions are pursued when necessary. This article will review common hand and wrist orthopedic disorders and help primary care physicians better understand hand and wrist pathophysiology and management.

## INTRODUCTION

Diagnosing and managing wrist and hand pain present unique challenges due to the intricate anatomy and complexity of the areas involved. While hand and wrist pain are prevalent, their causes can vary significantly, ranging from overuse injuries, repetitive strain, fractures, arthritis, and nerve compression to systemic diseases. Therefore, primary care physicians are crucial in accurately diagnosing and effectively managing these conditions. This article will review common hand and wrist disorders to determine when conservative management is appropriate and when referral to a specialist is necessary.

## CARPAL TUNNEL SYNDROME

### Symptoms

The symptoms of carpal tunnel syndrome (CTS) occur secondary to compression of the median nerve at the wrist from either direct anatomic impingement or from encroachment on the nerve stemming from underlying inflammation from a secondary cause.<sup>1</sup> Risk factors for CTS include obesity, female gender,

diabetes, pregnancy, rheumatoid arthritis, hypothyroidism, connective tissue disease, and pre-existing median nerve mononeuropathy.<sup>2</sup> Individuals who perform repetitive hand or wrist motions, particularly those working in occupations requiring prolonged forceful motions, are at increased risk of developing CTS.<sup>3</sup>

Patients often present with numbness and/or tingling of the affected hand in the median nerve distribution—the first three digits and the radial half of the fourth digit. Symptoms typically fluctuate in severity over many years and often progress to continuous severe symptoms, which can alter how patients perform daily activities. A common complaint from those affected by CTS is numbness or tingling, which occurs while the wrist is held in prolonged flexion, such as reading a book, talking on the phone, or driving. Patients commonly report that shaking their hands seems to improve symptoms briefly. Symptoms also tend to worsen during sleep, and those with CTS will notice they are waking up with a sensation of “pins and needles” in the affected hand.

### Diagnosis

Diagnosis of CTS is typically made clinically based on the patient's history and physical exam findings. Questions regarding characteristics, timing, aggravating and alleviating symptoms, as well as inquiry into pre-existing conditions, can be helpful. Tinell's and Phalen's tests are simple maneuvers that can safely and efficiently be performed at the bedside. Nerve conduction studies and electromyography can help confirm the diagnosis but are typically utilized to assess disease severity in patients considering surgical intervention.<sup>4</sup>

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## Treatment

Treatment for CTS is based on the severity of the patient's symptoms. For mild intermittent disease, cockup wrist splints (particularly worn at night), glucocorticoid steroid injections, and oral anti-inflammatory medications are sufficient in relieving symptoms. Referral for surgical decompression is advised in patients with signs of severe median nerve injury. The clinician should be observant for atrophy of the thenar muscles with concurrent weakness on physical exam. Often, patients with advanced CTS will report constant symptoms with a loss of finger dexterity and possibly hand or grip strength. A single injection of corticosteroid is typically the next therapeutic option. Injected corticosteroid is known to have an effective duration of 1 to 4 weeks in the target tissue; however, its long-term advantage for CTS is not supported by the available literature.<sup>5</sup>

Osteopathic manipulative treatment (OMT) has been recognized as a management option for CTS. The goals of OMT are to reduce sympathetic input through the upper thoracic, lower cervical, and thoracic inlet regions, improve tissue mobility, reduce nerve compression through reducing soft tissue edema, and improve muscle and tendon contraction and dimensions.<sup>6</sup> A recently published manuscript in the *Osteopathic Family Physician* journal by Baxter et al described various OMT techniques to treat CTS. These techniques include the myofascial release of the wrist, stretching the flexor retinaculum, the opponent's roll maneuver, counterstrain to the wrist and pronator teres, and the high-velocity, low-amplitude (HVLA) procedure to the carpal bones and radial head. In another study by Burnham et al, patients who underwent weekly OMT sessions for 6 consecutive weeks experienced improvement in symptoms and function associated with CTS.

Surgical carpal tunnel release should be considered after failed conservative treatments in patients with signs of severe disease (muscle atrophy, inability to perform daily activities) or in patients whose symptoms are not improving with optimized medical management of underlying causes.

## DE QUERVAIN'S TENOSYNOVITIS

De Quervain's tenosynovitis affects the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons in the first extensor compartment at the styloid process of the radius. It is a common cause of wrist pain in adults and is most common in females between 40 and 50 years.<sup>9</sup> Common associations with the disease process are repetitive motions, specifically those that require the thumb to be extended and abducted.

### Symptoms

Clinical presentation may include complaints of radial-sided wrist pain that is worsened with thumb or wrist movement, particularly thumb extension, and abduction. Pain is typically localized over the first dorsal compartment of the wrist at the extensor tendon.<sup>10</sup> Soft tissue swelling may be noted but is not always present. Some patients may complain of a catching or snapping sensation with thumb movement.

## Diagnosis

Diagnosis is typically made clinically based on presenting symptoms and physical examination. A physical examination will elicit tenderness with or without swelling over the first dorsal compartment of the wrist. The provocative Finkelstein test, in which the thumb is flexed and held inside a fist, with the patient actively deviating the wrist ulnarly, causes sharp pain along the radial wrist at the first dorsal compartment. Radiographic images of the hand and wrist are typically negative but may help rule out underlying pathology. Ultrasound imaging is not necessary to diagnose, but if performed, it may show thickened extensor retinaculum, APL, and/or EPB tendons.<sup>11</sup>

## Treatment

Conservative treatment is usually effective and includes resting the affected tendons by reducing repetitive motions, splinting the thumb with spica immobilization, ice, and oral or topical nonsteroidal anti-inflammatory medications. Corticosteroid injections may be useful, and in resistant cases, surgical release of the first dorsal compartment is an option.<sup>12</sup>

Trigger points in the APL muscle are relatively simple to treat and may relieve De Quervain's tenosynovitis symptoms. The practitioner may use one or two fingers to apply pressure over the trigger point in the muscle, applying pressure for ~30 seconds before releasing.

## SCAPHOID FRACTURES

Scaphoid fractures are mostly seen in males 15 to 30 years of age.<sup>13</sup> They typically occur due to a fall on an outstretched hand with greater than 95° of hyperdorsiflexion load of the wrist in radial deviation.

### Symptoms and Diagnosis

Patients usually present with mild pain at the radial side of the wrist, often worsened with movement or gripping. There may be wrist swelling or a feeling of heaviness at the anatomic snuffbox, which likely represents a wrist effusion (Figure 1). Snuffbox tenderness and/or pain with axial loading of the thumb should be treated as a scaphoid fracture until proven otherwise.<sup>14</sup> On physical exam, classic anatomic snuffbox tenderness was found to have a sensitivity of 85.71% and specificity of 29.62%, while scaphoid tubercle tenderness had a sensitivity of 95.23% and a specificity of 74.07% in the diagnosis of scaphoid fracture.<sup>15</sup> The absence of pain at these two locations makes diagnosing a scaphoid fracture highly unlikely. Other provocative tests should be performed to rule out other potential causes of pain.

Anteroposterior, lateral, and oblique radiographic views are required to evaluate a suspected scaphoid fracture. Management of scaphoid fractures depends on the anatomic location where the fracture occurs on the scaphoid bone (proximal, middle, distal) and whether the fracture is displaced or nondisplaced. A supplementary computed tomography (CT) may be performed to classify the fracture in fractures that are clearly visible on

radiographs, and displacement or instability is suspected.<sup>13</sup> Fractures in any anatomic zone of the scaphoid that are displaced are prone to nonunion and warrant referral to orthopedic surgery for further evaluation and potential for operative treatment.<sup>16</sup>

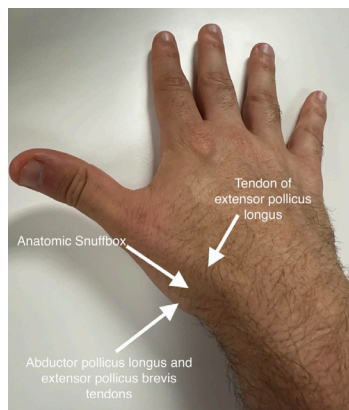
### Treatment

Non-displaced distal fractures heal well with strict immobilization in a short-arm thumb spica splint or cast. As the fracture line moves proximally, there is more risk of displacement and nonunion; therefore, it is appropriate to refer these patients for orthopedic evaluation. A long arm cast with thumb immobilization is appropriate if conservative treatment is attempted. In cases of suspected scaphoid fracture with negative initial radiographs, the wrist should be immobilized in a thumb spica splint or cast for 2 weeks, followed by repeated clinical and radiologic examinations.

Lymphatics of the upper extremity enter the thoracic or right lymphatic duct. Congestion at the thoracic inlet imposes myofascial restrictions that may impede proper lymphatic drainage and are, therefore, critical areas to address with OMT. While local OMT is an absolute contraindication in fractures, a physician can open the thoracic inlet using a direct or indirect approach to myofascial release. Relieving fascial restrictions at the thoracic inlet can promote the mobilization of inflammatory mediators and reduce edema, helping alleviate carpal tunnel symptoms.

FIGURE 1:

The anatomic snuffbox. Tenderness to palpation in this region warrants an X-ray to evaluate for a scaphoid fracture.



## FIRST CARPOMETACARPAL JOINT OSTEOARTHRITIS

Osteoarthritis (OA) of the first carpometacarpal joint (CMC), often referred to as “thumb-base osteoarthritis,” is a common cause of pain and disability. It is more prevalent in females and is strongly associated with age.<sup>17,18</sup>

### Symptoms

Many patients present with complaints of pain at the location of the joint, reduced grip strength, loss of range of motion, and joint stiffness, leading to impaired hand function and difficulty with daily activities. Pain can radiate from the base of the thumb

and wrist proximally to the distal forearm. For this reason, it is important to perform other provocative tests of the wrist and thumb to rule out other potential causes of wrist pathology.

### Diagnosis

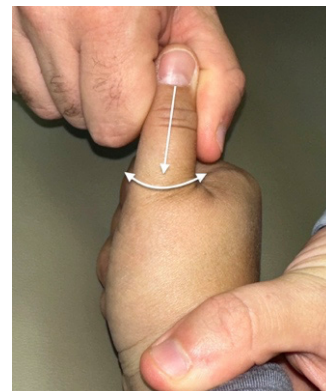
Diagnosis is often made clinically. Inspection of the hand may show signs of degenerative joint changes with bony prominence, soft tissue swelling, and limited range of motion in the joint. The grind test, which consists of axial loading and rotation of the thumb, has been found to have a sensitivity of 42% to 53% and specificity of 80% to 93% for CMC joint OA (Figure 2).<sup>19</sup> Definitive diagnosis can be achieved with AP, lateral, and oblique film radiographs. Findings consistent with OA include narrowing of the joint space, osteophytes, subchondral sclerosis, and cysts.

Treatment for CMC arthritis varies depending on the extent of the disease. Conservative modalities include avoidance of aggravating movements, ice, splinting, topical or oral nonsteroidal anti-inflammatory drugs (NSAIDs), and intra-articular corticosteroid injections. Splinting typically involves immobilization of the thumb with a thumb spica removable splint. Steroid injections into the CMC joint help control pain and reduce inflammation in and around the joint. A study by Day et al concluded that a steroid injection with 3 to 4 weeks of splinting for treating CMC joint arthritis of the thumb provided reliable long-term relief in thumbs with mild disease.<sup>20</sup>

OMT focuses on CMC joint mobilization using the anterior/posterior glide with distraction technique. In a double-blinded randomized control study performed by Villafañe et al, this technique decreased pain in the CMC joint in elderly female patients during six treatment sessions over 2 weeks. Surgical intervention is the last option for patients who have failed conservative treatment.

FIGURE 2:

Grind test for OA of the first carpometacarpal joint.



## GANGLION CYST

Ganglion cysts are benign soft tissue tumors mostly encountered at the dorsal wrist. They can occur in any age group; however, they are more common in females in their twenties to forties.<sup>22</sup> Ganglion cysts are mucin-filled synovial cysts containing paucicellular connective tissue. They may be filled with fluid from a tendon sheath or joint.<sup>23</sup>

## Symptoms and Diagnosis

On physical examination, ganglion cysts are usually 1- to 2-cm cystic structures, feeling much like a firm rubber ball that is well tethered in place by its attachment to the underlying joint capsule or tendon sheath. Most patients with ganglion cysts do not have symptoms besides swelling, and the clinical presentation is usually adequate for diagnosis. Ultrasound is often sufficient for assessing typical cysts and is the best initial diagnostic test, while magnetic resonance imaging (MRI) is the preferred imaging modality when atypical features or neurologic symptoms are present and in specific preoperative settings. The spontaneous resolution rate of untreated ganglion cysts ranges from 40% to 58%.<sup>24</sup> Therefore, reassurance is viable if the patient does not want any intervention. Patients must understand the benign nature of these cysts, as even after treatment, they have high recurrence rates.

## Treatment

Conservative treatment options include aspiration and/or steroid injections. Conservative methods typically carry lower complication rates and are used for symptomatic relief if the patient does not want surgery. Surgical excision remains the gold standard for the treatment of ganglion cysts. Patients should be informed about the risk of recurrence after excision of ganglion cysts, which can occur in up to 15% of excisions.<sup>25</sup> As with any surgical procedure, excision has higher rates of complication and longer recovery periods when compared to conservative measures.

## TRIGGER FINGER (STENOSING FLEXOR TENOSYNOVITIS)

Metacarpal fractures account for around 18% to 44% of total hand fractures, with the fifth metacarpal being the most fractured.<sup>34</sup>

## Symptoms

Finger stiffness and painless snapping are the main initial characteristics of TF. Further development of the condition can cause catching or popping to become painful with flexion and extension at either the metacarpophalangeal (MCP) or proximal interphalangeal (PIP) joints. A painful nodule may be palpated in the palmar MCP area. The patient may report MCP stiffness or swelling in the morning or that they awaken with the digit locked and that it loosens throughout the day.

## Diagnosis

TF diagnosis is made clinically based on the patient's presenting symptoms and physical examination findings. Ultrasound is being increasingly used to aid in the diagnosis by measuring the thickness of the affected tendon sheath compared with unaffected sheaths on the same or different hands. The degree of thickening seen on ultrasound is correlated with symptom severity.<sup>28</sup> The Quinnell grading system has been the most widely accepted system used to grade the severity of TF; however, it is rarely used clinically.

## Treatment

Treatments for TF range from conservative to invasive. Noninvasive management of mild-to-moderate TF consists of a combination of NSAIDs, activity modification, heat, or ice. Splinting the affected finger in extension may be needed to allow the tendon to heal. While stretches and exercises may provide relief to some patients, there is no widely agreed on exercise regimen, and exercises may be offered on a case-to-case basis. If conservative management fails, corticosteroid injections directly into the tendon sheath are effective and have been shown to completely resolve symptoms in 50% to 90% of patients.<sup>29</sup> If needed, a second and third corticosteroid injection may be given 4 to 6 months apart, but referral should be considered for surgical management after three unsuccessful injections. A newer alternative to corticosteroid injections, extracorporeal shockwave therapy (ESWT), is effective in symptom management but remains a third-line option behind conservative management and corticosteroid injections.<sup>30</sup> Surgical options include open surgical release and percutaneous release of the A1 sheath and are reserved for cases of severe TF that has failed conservative management.

## DUPUYTREN'S CONTRACTURE

### Symptoms

While TF is characterized by inflammation and catching of the flexor tendon, leading to difficulty in finger movement, Dupuytren's contracture involves thickening and tightening of connective tissue in the palm of the hand. TF and Dupuytren's contracture often present similarly and may be seen concurrently; as such, the primary care physician should consider both when initially diagnosing Dupuytren's contracture and vice versa. There is a strong genetic component in developing Dupuytren's contracture. Diabetes mellitus, hepatic diseases, smoking, HIV, epilepsy, and chronic occupational use of vibrating tools have been identified as risk factors.<sup>31</sup> Unlike TF, the symptoms of Dupuytren's contracture are often irreversible and progressive.

Patients with Dupuytren's disease will typically initially notice a palpable nontender nodule near the distal palmar crease, which progresses into a fixed flexion contracture of the affected fingers at the MCP and PIP joints. At this stage, the patient typically experiences a loss in the range of motion of the hand and palpable cords in the palm extending into the digits. The condition is rarely painful.

### Diagnosis

Diagnosis is typically made clinically. The tabletop test is performed by having the patient attempt to place the palm flat on the exam table. If there is any flexion contracture deformity, the patient cannot straighten the fingers, resulting in a positive test.<sup>32</sup> While imaging studies such as X-rays and ultrasounds may demonstrate underlying bony abnormalities and thickening of the palmar fascia, they are not necessary nor clinically useful in diagnosing or monitoring the condition.



## Treatment

Management of Dupuytren's contracture is dictated by the patient's quality of life. Many patients with a positive tabletop test, MCP contracture of 30°, or PIP contracture of 15 to 20° will elect to have treatment.<sup>33</sup> Management typically starts with conservative measures, including physical/occupational therapy, splinting, bracing, and home stretches/exercises. Corticosteroid injections may be attempted but are not as effective as when used for TFs. Other modalities such as needle aponeurotomy and collagenase injections have been studied, but more research is needed to warrant their use in the primary care setting. Referral to a hand surgeon should be considered if there is any sign of disease progression or conservative management failure as surgery is the mainstay of treatment with Dupuytren's disease.

## METACARPAL FRACTURES

Metacarpal fractures account for around 18% to 44% of total hand fractures, with the fifth metacarpal being the most fractured.<sup>34</sup>

### Diagnosis

A thorough history and physical exam must be done with a focus on key aspects of the patient's history, including age, hand dominance, occupation, and mechanism of injury. Specific components of the physical exam include assessing for shortening of any digit compared to the opposite hand or rotational deformity. The overriding of one finger over the other at the time of presentation is most useful for detecting a rotational deformity. A more subtle way to detect malrotation occurs when the patient flexes their fingers into their palm. All the fingers should point towards the scaphoid tuberosity when flexed; however, in the presence of a rotational deformity, scissoring of the fingers becomes obvious.<sup>35</sup> Three radiographic views (posterior-anterior or anterior posterior, lateral, and oblique) are necessary for diagnosis and should be ordered initially when a fracture is suspected. Metacarpal fractures are divided into head, shaft, or neck fractures.

### Metacarpal Head Fractures

Metacarpal head fractures are rare yet challenging to treat because of their involvement with the articular surface, increasing the risk for osteonecrosis. For fractures of the metacarpal head that involve less than 20% of the joint surface, nonoperative management can be undertaken with immobilization in the intrinsic plus position with a splint (Figure 3).<sup>36</sup> For those fractures with a greater disruption of the articular surface, referral to an orthopedic hand surgeon is indicated.

### Metacarpal Neck Fractures

Metacarpal neck fractures typically result from direct trauma, such as when a patient strikes a hard surface with a clenched fist or may be seen following falls or crush injuries. The most frequently encountered metacarpal neck fractures occur at the fifth metacarpal neck, otherwise known as "boxer's fracture." While there are no widely accepted guidelines, in general, metacarpal neck fractures with angulation of less

than 10° for the index finger, less than 15° for the long finger, less than 30° for the ring finger, and less than 40° for the small finger that have no associated rotational deformity may be managed conservatively, with immobilization in the intrinsic plus position for 4 weeks followed with serial radiographs.<sup>37</sup> For metacarpal neck fractures with a rotational deformity, the Jahss reduction maneuver may be attempted, followed by splint or cast immobilization. It is important to note that a neurovascular examination should be undertaken before and following any reduction attempt. Referral to a hand surgeon is necessary for a comprehensive evaluation if any malrotation is detected, regardless of a successful closed reduction.

### Metacarpal Shaft Fractures

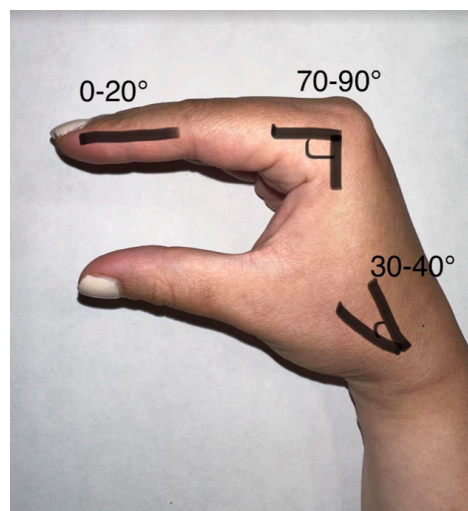
As with metacarpal neck fractures, metacarpal shaft fracture injuries that are minimally or nondisplaced without significant angulation, rotational deformity, or shortening, can be managed conservatively with cast immobilization for 4 weeks, with the MCP joints placed in 70 to 90° of flexion followed by serial radiography.<sup>38</sup> The presence of rotational deformity, significant metacarpal shortening, or prominent dorsal deformity should be referred for consideration in operative management.

## THUMB SPRAIN (ULNAR COLLATERAL LIGAMENT INJURY)

A sprained thumb occurs when the ligaments that support the thumb are stretched beyond their limits, leading to damage. Most thumb sprains involve the ulnar collateral ligament (UCL) of the thumb. The UCL is located on the medial side of the MCP joint, extending from the head of the first metacarpal and the base of the proximal phalanx. The UCL is the primary restraint to valgus stress. Hyperabduction and hyperextension forces applied to the MCP joint are the usual causes of this stress.<sup>39</sup> The condition has

FIGURE 3:

Intrinsic plus position. The hand should be splinted in this position for metacarpal head fractures involving more than 20% of the joint surface.



been referred to as “gamekeeper’s thumb” due to the observed association of this injury in gamekeepers who sustained chronic valgus strain injury of their thumbs when breaking rabbit necks. The term “skier’s thumb” exists for the acute counterpart of this injury because it is prevalent among skiers.

### Symptoms and Diagnosis

In acute cases, UCL injuries present with a history of trauma and pain with difficulty moving the thumb. Bruising and swelling at the base of the thumb may also be seen. In chronic cases, there may be weakness in the thumb-index pinch grip and instability.<sup>40</sup> The weakness of the pinch grip leads to marked limitations in basic activities of daily living, such as opening jars or turning keys. If left untreated, the joint laxity may lead to degeneration, increasing the risk of arthritis of the thumb MCP joint.<sup>41</sup> Performing a valgus stress test by abducting the thumb at its base can help to determine if any laxity or complete disruption of the UCL exists. Contralateral comparison with the unaffected thumb can help establish a baseline to delineate further the degree of tear or injury.<sup>42</sup>

Anteroposterior and lateral X-ray films of the thumb may be taken to rule out any associated bony injuries. Associated bony avulsion fractures are seen in 20% to 30% of UCL ruptures.<sup>43</sup> Ultrasound may be used at the bedside to assess for MCP joint laxity. MRI is most sensitive and specific for UCL injuries, and avulsion fractures but may be difficult to obtain in the acute setting.

### Treatment

Patients with UCL injuries should be urgently referred to hand surgery when an avulsion fracture is confirmed or suspected, a displaced fracture is suspected in an acute grossly unstable joint, or cases of volar subluxation are seen on radiographs.<sup>44</sup> Without the above findings, UCL injuries can be treated with rest, ice, and immobilization by applying a thumb spica splint. The recommended timeframe for the typical immobilization is 3 weeks. Physical therapy may be utilized.

### CONCLUSION

Management of wrist and hand pain involves a multidimensional approach, often encompassing a combination of pharmacologic interventions, physical therapy, occupational modifications, splinting, and sometimes referral to specialized hand surgeons. Primary care physicians are pivotal in coordinating and monitoring these treatment modalities, ensuring optimal patient outcomes, and fostering a continuum of care that extends beyond the confines of a single visit. With a better understanding of the disorders and their initial evaluation and management, indications for referral to a musculoskeletal specialist, and the need for operative management, primary care physicians can better aid in diagnosing, caring for, and facilitating recovery in their patients with these common disorders.

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