# Hand and Wrist Injuries in Golf

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#### **Disclosures for this Article**

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#### Learning Objectives

- Appreciate the physical demands required during the golf swing.
- Recognize the various musculoskeletal injuries among professional and amateur golfers.
- · Describe acute and repetitive upper extremity injuries among golfers.
- Discern soft tissue and bony injuries of the hand and wrist related to golfing.
- Discuss prevention and treatment of golf-related wrist and hand injuries.

**Deadline:** Each examination purchased in 2013 must be completed by January 31, 2014, to be eligible for CME. A certificate will be issued upon completion of the activity. Estimated time to complete each month's JHS CME activity is up to 2 hours.

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HE GAME OF GOLF HAS SEEN substantial growth on a global scale over the last few decades. With more than 60 million players worldwide, it has become a sport that has transcended socioeconomic class, sex, and age. Therefore, the

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0363-5023/13/38A10-0028\$36.00/0 http://dx.doi.org/10.1016/j.jhsa.2013.07.019 development of golf-related injuries is becoming increasingly prevalent in patients of all ages and golfing ability.

It is a common misperception that the golf swing is a seemingly benign and low physical demand activity. However, on careful examination, it is composed of a series of coordinated and synchronized movements of the entire body that allows the golf club to generate speeds in excess of 100 mph and launch the ball more than 300 yards. For both professional and amateur golfers, injuries to the hand and wrist are extremely common, and the hand and wrist are the most frequently affected sites, following the lumbar spine.<sup>1,2</sup> Professional and high-level golfers most often sustain overuse injuries as a result of repetitive swings from



**FIGURE 1: A**, **B** Clinical photographs demonstrating subluxation of the ECU tendon (arrows) in and out of the groove during wrist motion. **A** During wrist extension and pronation (backswing), the ECU tendon remains within the groove; however, following impact with the ball, **B** the wrist moves into flexion and supination (follow through), and the ECU tendon subluxates out of the groove. **C** A T1-weighted MRI scan showing marked inflammatory changes around the ECU tendon (arrow) with complete disruption of the ECU sheath.

frequent practice sessions.<sup>3</sup> Although amateur golfers may also sustain such injuries, the more common mechanisms observed are poor swing mechanics, overzealous playing, or a sudden traumatic event such as hitting a tree or the ground awkwardly.<sup>1</sup>

## **CLINICAL EVALUATION**

In Brief

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A detailed history and careful examination are critical to make an accurate diagnosis when evaluating a golfer with hand and wrist injuries. In addition to the standard questions that are asked about any hand and wrist problem, pertinent information includes onset of the symptoms, the level of the golfer, which can often be ascertained by their handicap, whether they are right or left handed, and during which phase of the golf swing the symptoms become most prominent.

In general, the majority of golf injuries occur in the lower hand. Therefore, for a right-handed golfer, the left hand and wrist are most commonly affected. The ability of the golfer may indicate whether the injury is related to overuse, which is more commonly seen in the higher-level golfer.<sup>3</sup> However, patients will often be able to tell you whether the onset of the symptoms was insidious or related to a traumatic event, such as hitting a rock or tree or taking a large divot. In addition, knowing the phase of the golf swing (ie, backswing, downswing, impact, followthrough) that exacerbates the symptoms can also indicate the nature of the injury. For example, pain from tendinosis of the flexor carpi ulnaris and extensor carpi ulnaris (ECU) may be experienced during the top of backswing, when the lower wrist goes into excessive radial deviation, thus putting stress on those tendons. Another phase of the golf swing that is commonly associated with injuries is the follow-through, just after impact, when the lower wrist suddenly undergoes flexion, ulnar deviation, and supination, frequently leading to pain from ECU tendinitis, tendon instability, and possibly a tear of the triangular fibrocartilage complex (TFCC). In this brief review, we describe the most common golfrelated injuries to the hand and wrist and outline clinical evaluation and subsequent management.

# EXTENSOR CARPI ULNARIS TENDON INSTABILITY

Instability of the ECU tendon can result following disruption of the tendon sheath, which commonly occurs from a sudden forceful impact, such as taking a large divot with the wrist in ulnar deviation and supination. Therefore, during the golf swing, when the wrist supinates, ulnar deviates, and flexes during impact, a painful snapping or clicking sensation can occur over the dorsoulnar side of the wrist as the tendon shifts in and out of the groove (Figs. 1A, 1B). Patients often point to their area of tenderness over the ECU tendon, and voluntary subluxation may be observed. Dynamic ultrasound and magnetic resonance imaging (MRI) can confirm the diagnosis (Fig. 1C). Initial treatment for acute ECU instability is composed of rest and strict long arm splinting for 4 to 6 weeks with the wrist in extension, radial deviation, and supination, followed by an additional 4 weeks of removable splint use. In patients with recurrent symptomatic instability, ECU tendon





**FIGURE 2:** A Photograph showing the surface landmark for the hook of hamate (circle) and how the end of the golf club can impact into the bony prominence. **B** Axial CT scan demonstrating a fracture at the base of the hook of the hamate (arrow).

stabilization with repair or reconstruction of the tendon sheath is necessary.<sup>4,5</sup>

#### TRIANGULAR FIBROCARTILAGE COMPLEX TEAR

Tears of the TFCC are not uncommon due to excessive and repetitive rotational motions that occur in the wrist joint during the golf swing. Patients often present with ulnar-sided wrist pain, with tenderness in the fovea region or a palpable click on forearm rotation. The distal radioulnar joint should be examined, as it may be unstable in patients with larger peripheral TFCC tears. The MRI scan is the imaging study of choice and has been reported to be highly accurate in diagnosing TFCC tears.<sup>6</sup> Initial treatment involves a period of immobilization of the wrist and forearm, nonsteroidal anti-inflammatory drugs, and corticosteroid injection. For patients who have failed nonsurgical management or those who are high-level athletes for whom early return to preinjury level is imperative, wrist arthroscopy may be warranted.<sup>7</sup> Treatment largely depends on the type of TFCC tear and its location. Central tears are commonly debrided, whereas peripheral tears frequently require arthroscopic or open repair of the TFCC tear, followed by a period of immobilization.<sup>8,9</sup>

# HOOK OF HAMATE FRACTURE

Fractures of the hook of hamate are the most common bony injury seen in golfers and occur almost exclusively in the lead hand. Due to the prominence of the hook into the palm, it becomes vulnerable to injury when the golfer strikes the ground abruptly. Patients most often complain of focal tenderness over the hook when gripping a club and have pain during ball strikes (Fig. 2A). In addition, paresthesias into the ulnar 2 digits may be experienced if the adjacent ulnar nerve is irritated. Less commonly, the flexor tendons to the ulnar 2 digits may be associated with clicking and the potential risk for rupture due to abrasion of the tendons along the raw bone surface of the fracture. Initial evaluation includes plain radiographs with a carpal tunnel view. However, computed tomography (CT) is often required to clearly delineate the size and location of the fracture (Fig. 2B). Because the pisohamate ligament, transverse carpal ligament, flexor digiti minimi brevis, and abductor digiti minimi all attach to the hook, union is often difficult. If there is persistent pain, neurological symptoms, or risk to the flexor tendons, we recommend excision of the hook of hamate, as this will allow speedy recovery without any notable sequelae to the golfer.<sup>10,11</sup>

#### **TRIQUETRO-HAMATE IMPINGEMENT**

Triquetro-hamate impingement is a rare cause of disability for the golfer, often presenting as ulnarsided wrist pain in the lead hand. As the wrist maximally extends and ulnar deviates, the triquetrum



**FIGURE 3:** A Plain radiograph showing impaction of the triquetrum against the hamate in extreme ulnar deviation (arrow). **B** The T1-weighted, 3-dimensional, fat-suppressed MRI images demonstrating degenerative changes at the ulnar aspect of the triquetro-hamate articulation (arrow) with overhanging osteophyte formation due to chronic impaction.

impacts into the hamate. Examination will elicit point tenderness over the hamate, but the diagnosis is often challenging (Fig. 3). Arthroscopy through the midcarpal portal may aid in assessment and allow debridement of any associated chondromalacia.<sup>12</sup> However, after the impingement is diagnosed, treatment includes modification of the player's swing mechanics, which may be facilitated by consulting a golf professional and using anti-inflammatory medication, with arthroscopy and debridement reserved for failed nonsurgical treatment.

#### **PISOTRIQUETRAL ARTHRITIS**

Another potential cause of ulnar-sided wrist pain in the golfer is pisotriquetral arthritis.<sup>13</sup> Patients are often tender to direct palpation of the pisiform, and this is exacerbated with translation of the pisiform while compressing it to the triquetrum (pisotriquetral shear test). Initial evaluation includes a 30° oblique wrist x-ray centered through the pisotriquetral joint, which can be confirmed with either MRI or CT. Differential lidocaine injection, with or without corticosteroids, into the pisotriquetral joint may aid in diagnosis and also therapy. If pain is persistent, especially when gripping the club, surgery may be necessary, consisting of excision of the pisiform.<sup>14</sup>

## **ULNAR STYLOID IMPINGEMENT**

Ulnar styloid impingement may occur during maximal ulnar deviation of the wrist, commonly at the point of impact. Symptoms can be reproduced with forced ulnar deviation of the wrist, which results in tenderness over the ulnar styloid.<sup>15</sup> Ulnar variance should be determined from neutral posteroanterior radiographs, because positive variance may contribute to this condition. The morphology of the ulnar styloid should also be assessed, and MRI can determine the presence of any edema within the ulnar carpals, thus confirming the impaction.<sup>16</sup> Nonsurgical management entails correction of swing mechanics, anti-inflammatory drugs, and rest. However, if symptoms persist, arthroscopic or open ulnar styloidectomy may aid the golfer to returning to play.<sup>17</sup>

In conclusion, although golfing injuries of the hand and wrist are common, most are preventable through proper understanding of swing mechanics, avoidance of repetitive and excessive practicing and playing, and also ensuring that the hands are appropriately placed on the club to minimize impact injuries.

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#### JOURNAL CME QUESTIONS

#### Hand and Wrist Injuries in Golf

For a right-hand golfer, which of the following anatomical areas are most affected?

- a. The right hand and wrist are most commonly affected, followed by the hip
- b. The left hand and wrist are most commonly affected, followed by the spine
- c. The left shoulder is the most commonly affected, followed by the knee
- d. The right shoulder is most commonly affected, followed by the spine
- e. Both hands and hips

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# Extensor carpi ulnaris tendon instability from golfing develops during which swing phase and wrist position?

- a. During follow-through while the wrist is flexed
- b. During impact while the wrist is in neutral position
- c. During the backswing while the wrist is in extension
- d. During follow-through while the wrist is in ulnar deviation
- e. During impact while the wrist is ulnarly deviated and flexed

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