Medical Examination and Treatment for Hand Sports Injuries and Disorders

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Abstract: There are relatively many opportunities to encounter hand sports injuries and disorders in ordinary clinical practice. However, if the selected treatment is inappropriate, a notable disorder may remain. To prevent this, it is important for coaches to understand the significance of primary care and advise the athlete to be treated appropriately at the initial stage. It is also desirable that physicians who regularly examine them provide appropriate treatment at the first examination. In this paper, we will discuss the diagnosis and treatment for sports injuries specific to hands and fingers, and sports disorders requiring surgical treatment.

Key words: Scaphoid fracture; Fracture of the hook of hamate; Mallet finger; Sports disorders

Introduction

Clinically, in hand injuries and disorders, cases due to a single major injury such as falling are likely to display local pain and swelling, and can be treated relatively easily. However, because there are some specific sports related injuries, if the selected treatment is inappropriate, a notable disorder may remain.

However, in the case of the hand, sports disorders that are induced by chronic stimulation such as repetitive minor injuries, do not greatly affect basic actions such as running and jumping in comparison to injuries in other sites. Therefore, such cases are not dealt with since they are not considered to be serious, and the athlete continues to be active in the sport. As for dealing with hand sports injuries and disorders, it is important for coaches to instruct athletes about understanding the importance of primary care sufficiently. It is also desirable that physicians who examine them regularly to provide appropriate treatment during the first examination. In this paper, we will discuss sports injuries specific to hands and fingers, and sports disorders requiring surgical treatment.

Hand Sports Injuries

1. Scaphoid fracture

The scaphoid fracture is the most common fracture of the carpus in sports. This fracture
occurs not only when athletes fall on their outstretched palm, but also occurs when the severe hyperextension and slight radial deviation of the wrist is forced when receiving a pass in volleyball or blocking a shot in soccer. The bone union in a scaphoid fracture is not achieved easily. Because the symptoms at the initial stage are slight, the patient believes this to be a simple distortion and continues playing the sport, consequently inducing pseudoarthrosis. Even if the patient consults a local clinic or hospital, it is unlikely to be diagnosed using the usual radiograms.

Many cases are left untreated, and the patient usually consults a local clinic or hospital after it develops into pseudoarthrosis. Although MRI is useful during early diagnosis when tenderness is present in the scaphoid part, it is important to suspect this as a fracture. In acute cases, conservative treatment is selected for stable cases, and surgical treatment for unstable cases. However, in the case of conservative treatment, the immobilization period with the thumb spica cast is long, i.e., six to eight weeks. Thus, for patients who desire to return to their sports at an early stage, an internal fixation with screws is conducted, and even in many stable cases, the immobilization period is shortened (Fig. 1).

2. The fracture of the hook of hamate

A fracture of the hook of hamate is sometimes difficult to diagnose using radiography. Therefore, initial diagnosis can be difficult. This fracture is thought to occur due to repetitive stress to the hook of the hamate from the grip end of a golf club, baseball bat, or tennis racquet. CT is the most useful technique for diagnosing this type of fracture (Fig. 2). In most instances, unless the diagnosis is delayed, union is likely after immobilization, but excision of the fragment may be necessary for nonunion, persistent pain, or ulnar nerve palsy. For patients who desire an early return to their sports activities, excision of the fragment may be indicated.
3. The fracture of the metacarpal bone or phalanges

In fractures of the metacarpal bone or phalanges, if a severe deformity (especially rotation deformity) is not present, the fracture is treated conservatively in many cases. In intra-articular fractures such as a dislocation fracture of the proximal interphalangeal joints, a dislocation fracture of the carpometacarpal joint of the thumb (Bennett fracture) (Fig. 3), and avulsion fractures at the insertions of tendons and ligaments, a slight dislocation of a bone fragment may interfere with sports activities later. Thus, the fragments should be reduced and fixed internally to restore joint function, tendon or ligament function as well as joint integrity at an early stage in many cases. 1

4. Mallet finger

Disruption of the terminal extensor tendon that results in a flexion deformity of the distal interphalangeal joint is commonly referred to as a mallet finger. Among finger injuries in sports, a high incidence of mallet finger is seen in ordinary medical practices. Fractures of the dorsal lip of the distal phalanx are classified into two types according to the fracture pattern. One is the extensor origin type (a small avulsion fracture), which occurs when the terminal extensor tendon is ruptured by a forceful blow to the tip of the finger causing sudden flexion and the other is the bony origin type (larger fracture of 20% to 50% of the articular surface) that occurs in hyperextension injuries of the distal interphalangeal joint (Fig. 4). 2

If there is laceration at or proximal to the distal interphalangeal joint with loss of tendon continuity, treatment usually consists of continuous distal interphalangeal joint extension splinting with an aluminum splint for 6 to 8 weeks. For fractures involving more than one third of the articular surface with associated subluxation and dislocation, closed reduction and percutaneous fixation using the Ishiguro method is recommended. 3

5. Jersey finger

Jersey finger occurs through action of the
hand being shaken off, notably when athletes grasp an opponent’s jersey or pants in rugby or American football. When there is a strong flexion force on the distal interphalangeal joint, a strong external extension force is added to resist the flexion force, and the tendon of the flexor digitorum profundus is ruptured at the site attaching the distal phalanx. The ring finger and the little finger are most frequently injured. Because the fragment usually is small and displaced widely by the pull of the tendon, treatment is directed toward soft tissue avulsion and may consist of open reduction and surgical repair of the terminal flexor tendon using the pull-out method.

6. Skier’s thumb

An injury to the ulnar collateral ligament of the thumb metacarpophalangeal joint, commonly referred to as gamekeeper’s thumb or skier’s thumb, is very common. It is likely to occur during skiing accidents when the athlete falls on an outstretched hand with forceful radial and palmar abduction of the thumb. In this injury, because of the anatomical feature where the ruptured edge of the ulnar collateral ligament may become displaced and folded back on itself beneath the proximal edge of the adductor aponeurosis (Stener’s lesion), natural healing may be impossible in some cases. Differentiating between an incomplete and complete rupture of the ulnar collateral ligament is necessary because incomplete ruptures are treated nonoperatively and complete ruptures require surgery.

An injured thumb that demonstrates more than 25 degrees of instability compared to the uninjured side by anteroposterior stress roentgenograms is indicative of a complete rupture. Acute complete ruptures of the ulnar collateral ligament should be treated with surgical repair of the ligament. If the repair is done several months after the injury, a graft can be used to replace the ligament. Recently, the graft using palmaris longus tendon can be threaded through the proximal and distal attachments of the ligament and attached by interference screws (TJ screw system) to reconstruct the ligament. Favorable results have been obtained. Since ordinary living as well as sports activities may be disturbed markedly, early and appropriate diagnosis and treatment is required.

Hand Sports Disorders

1. Injuries of the triangular fibrocartilage complex (TFCC)

When evaluating patients with painful wrists, it is important to try to anatomically localize the source of the pain. The triangular fibrocartilage complex (TFCC) is the ligamentous and cartilaginous structures attaching the distal ulna to the distal radius and ulnar side of the carpus. Among sports disorders conventionally treated as a distortion of the wrist joints, the injury of the TFCC is one whose pathologic conditions have been clarified recently. The injury occurs due to direct compression or shearing stress between the ulnar head and carpus during sports. The useful diagnostic methods are history, physical examination (ulnocarpal stress test), roentgenography, arthrography and arthroscopy. As for its treatment, the patient is instructed to rest, a splint fixation is attempted to avoid repetitive external force, and conservative treatment is conducted. However, when conservative treatment cannot be conducted due to the unique properties of some sports or because it is ineffective, the condition of TFCC is confirmed under arthroscopy of the wrist joint. Subsequently, synovectomy and a partial resection or repair of TFCC are performed.

2. Ulnar abutment syndrome

Pain at the ulnar aspect of the wrist indicates ulnar abutment syndrome, and it is caused when the wrist joint is used continuously under the condition of ulnar plus variance due to some cause. The abutment of the ulnar head causes pain at this site and TFCC tears and perforations accompany many cases. Treatment,
that aims to improve the ulnar plus variance, the ulnar shortening procedure, radial lengthening, and limited ulnar head excision have been reported. There have been many reports stating that the ulnar shortening procedure, based on the Milch method, is useful for athletes.

3. Scaphoid impaction syndrome and ulnar styloid impaction syndrome

In scaphoid impaction syndrome or ulnar styloid impaction syndrome, when axial pressure is exerted repeatedly at the outstretched wrist joint, the styloid process of radius and the scaphoid dorsal side impact each other to cause pain, or the ulnar styloid process impacts the triquetrum to cause pain. Although conservative treatment is conducted initially, excision of the styloid process and synovectomy are performed for refractory cases.

4. Lunatomalacia (Kienböck disease)

Kienböck disease is a painful disorder of the wrist due to unknown causes where roentgenograms show avascular necrosis of the carpal lunate. In 75% of patients, the disorder is preceded by severe trauma resulting from sports injuries, usually with the wrist in severe dorsiflexion in soccer, volleyball, American football, karate, and other sports. Major complaints are swelling and pain on the dorsal side of the hand joint, restricted range of motion at the dorsiflexion of the wrist joint, and reduced gripping power. CT scanning and MRI may be required to see the disorder. No abnormality may be found on radiograms during the early stages. Some have preferred simple casting if the disease is considered to be quite early (stage I or II, before sclerosis, fragmentation, or collapse occurs). Late stage cases (stage III) are referred for surgical treatments such as radial shortening, radial wedge osteotomy, ulnar lengthening, excision and prosthetic replacement, and revascularization procedure. When secondary arthritic changes have developed throughout the wrist (stage IV), treatment usually consists of proximal carpal row resection or wrist arthrodesis.

Conclusion

We discussed sports injuries specific to the hands and fingers, and sports disorders that require relatively frequent surgical treatment. Hand sports injuries and disorders are encountered in ordinary medical practice relatively often. For athletes, the functional disorders of the hands may advance to a disorder comparative to the disorders of the knee or ankle joints. The disorder should not be regarded simply as a disorder of only one finger joint, but must be treated appropriately, based on an accurate diagnosis. When physical findings such as pain and gripping power do not improve in one to two weeks after the first examination, the patient should be immediately referred to an orthopedic hand surgeon.

REFERENCES