Although ulnar collateral ligament tear of the thumb is not uncommon, few reports have described this injury with magnetic resonance imaging (MRI) findings. We present a case of a 46-year-old woman who suffered from painful disability of her right thumb soon after a motorcycle accident. MRI of 2-mm slice thickness showed minimally retracted fibers of the torn ulnar collateral ligament of the right thumb, but the adductor aponeurosis was intact. A control study of the normal left thumb well delineated the course of the intact ulnar collateral ligament. Surgical findings revealed a nondisplaced ulnar collateral ligament tear near the proximal margin of the adductor aponeurosis. The ulnar collateral ligament was then repaired. Follow-up MRI at nine months after surgery showed a repaired ligament without evidence of re-tear. The patient’s symptoms were almost subsided.

Key words: Ligaments, injuries; Magnetic resonance; Skier’s thumb

Injury of the ulnar collateral ligament of the thumb is one of the most frequently occurring ligament injuries of the hand. Patients who have this injury may complain of pain, swelling, or tenderness over the metacarpophalangeal joint, and decreased pinch or grasp strength of the injured thumb. Injury of the ulnar collateral ligament has been reported most often related to skiing injuries [1]. The high velocity while skiing can place a significant abduction force on the thumb during a fall. Similar mechanism of trauma to the ulnar collateral ligament of the thumb can result from sports injuries and cycling accident with falling on the hand. The term skier’s thumb is appropriately applied to acute injuries, whereas gamekeeper’s thumb usually may stand for chronic injuries.

The ulnar collateral ligament is a capsular ligament that originates from the dorsal ulnar aspect of the metacarpal head and courses distally and volarly to insert on the volar and ulnar aspect of the proximal phalanx (Fig. 1a). Ulnar collateral ligament tear is usually from its distal end at the base of the proximal phalanx. Magnetic resonance imaging (MRI) can differentiate nondisplaced and displaced ulnar collateral ligament tears [2]. We herein present a case of nondisplaced ulnar collateral ligament tear with MRI findings before and nine months after the surgical repair.

CASE REPORT

A 46-year-old woman suffered from painful disability of her right thumb soon after a motorcycle accident two weeks previous to admission. She hit on the ground with her right hand during the accident. She had been treated by a bonesetter but in vain. She had recently felt exaggeration of the painful disability of her injured thumb.

On physical examination, tenderness and swelling were noted along the ulnar aspect of the metacarpophalangeal joint. Stress test revealed radial subluxation of the metacarpophalangeal joint. Plain radiographs revealed no evidence of avulsion fracture of the right hand or phalanges. MRI examination was performed three weeks after the injury. Coronal gradient-echo MRI (2-mm thick) of the left thumb, as a control,
performed and demonstrated an intact ulnar collateral ligament beneath the adductor aponeurosis (Fig. 1a). For the injured right thumb, the same MR pulse sequence showed minimally retracted fibers of the torn ulnar collateral ligament beneath the adductor aponeurosis (Fig. 1b), suggesting tear of the ligament. Axial images showed a stump-like ligamentous fragment at dorsal side of the distal metacarpal bone (Fig. 1c). Minimal fluid within the first metacarpophalangeal joint was noted.

One day later, the patient received surgery to repair the torn ulnar collateral ligament. A nondisplaced ulnar collateral ligament tear was identified near the proximal margin of the adductor aponeurosis. After repair, follow-up physical examination revealed absence of instability of the injured thumb. Nine months after surgery, MRI showed an intact ligament without evidence of re-tear (Fig. 1d, 1e).

**DISCUSSION**

Ulnar collateral ligament provides the major resistance to a radially applied stress [3]. Cutting the volar plate and the ligament significantly increase sub-

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**Figure 1.** A 46-year-old woman with an injured right thumb and a normal left thumb. 

a. Coronal gradient-echo MR image (TR/TE = 350/15 ms, flip angle = 20°) of left thumb shows an intact ulnar collateral ligament (arrow), which lies deep to the adductor pollicis aponeurosis (open arrow). The contralateral side is an intact radial collateral ligament. The high-signal-intensity subcutaneous area is a burnout artifact from surface coil. 

b. Coronal gradient-echo MR image (TR/TE = 400/15 ms, flip angle = 20°) of the injured right thumb shows minimally retracted fibers (arrow) of the torn ulnar collateral ligament beneath the adductor pollicis aponeurosis (open arrow). Minimal fluid within the first metacarpophalangeal joint is noted. The radial collateral ligament is not torn, but the discontinuous ligament is due to partial volume effect. 

c. Axial T2-weighted image (TR/TE = 2300/105 ms) shows a stump-like area (arrow) of low signal intensity in the dorsal side of the metacarpal bone (m), suggestive of minimally retracted fragment of the torn ligament. 

d-e. Follow-up MRI at nine months after surgery. Two consecutive (2mm apart) gadolinium-enhanced fat-saturation T1-weighted images (TR/TE = 650/12.8 ms) show a thin bandlike structure of the repaired ligament (arrow) lies beneath the adductor aponeurosis (open arrow).
luxation of the metacarpophalangeal joint. However, transection of the adductor aponeurosis alone has no effect on joint laxity. In contrast to our case with proximal tear, ulnar collateral ligament tear is usually from its distal end at the base of the proximal phalanx; the adductor pollicis aponeurosis usually remains intact [4].

The mechanism of ulnar collateral ligament trauma is a result of hyperabduction, which is often accompanied by varying degrees of hyperextension of the metacarpophalangeal joint of the thumb. The high velocity while skiing can place a significant abduction force on the thumb during a fall. The high-speed of injury makes a similar lesion during motorcycle accident, as in our case.

Stener [5], in 1962, was the first to describe a complication of complete ulnar collateral ligament tear in which the torn end of the ligament may fold over and become displaced proximally and superficially to the adductor pollicis aponeurosis. He observed that after the initial rupture of the ulnar collateral ligament, given greater degrees of abduction and flexion of the proximal phalanx, the ruptured ligament can retract and allow the adductor pollicis aponeurosis to become interposed between the ligament and its bony attachment [5]. These findings can explain why conservative treatment often fails. Therefore, it is impossible to obtain stability of the ulnar side of the metacarpophalangeal joint without surgical repair.

It is also important to differentiate a partial from complete tear of the ulnar collateral ligament. Partial tears can be treated by plaster immobilization whereas complete tears can be treated either by plaster immobilization or by operative repair. All repair of the ruptured ligament should have prompt surgical treatment due to intervention is difficult if done more than three weeks after the injury. An untreated complete tear of the ligament can lead to chronic laxity and eventually degenerative arthropathy [6].

Previous authors [7] reported false negative rates as high as 46% for the detection of a Stener lesion utilizing clinical examination alone. Ultrasound is useful in the evaluation of torn ulnar collateral ligament, but MRI is better than ultrasound in differentiating displaced from nondisplaced tears [2]. Hemorrhage, effusion, and edema do not affect the diagnosis with MRI because the torn ulnar collateral ligament fragment, even if it is dislocated, retains its low-signal-intensity appearance. In addition, the gap between the torn ends of the ligament appears as a high-signal-intensity line interrupting the low-signal-intensity ligament. However, MRI is not always possible to differentiate nondisplaced from displaced ligament in an old ligamentous rupture [8].

On MR images, a Stener lesion usually shows that the proximal end of the ruptured ligament is retracted or folded back on itself so that it lay superficial to the adductor aponeurosis [2, 6, 9]. The T2-weighted turbo spin-echo (TSE) sequence has been reported to be the most useful technique in showing status of the ulnar collateral ligament [8]. T2-weighted TSE sequence was less time consuming and had a better resolution than the T2-weighted spin echo sequence. Sensitivity and specificity were both 100% for MRI in evaluation of ulnar collateral ligament tears [2].

No definition has been applied to acute or chronic tears of ulnar collateral ligament. However, if surgery is performed within 48 hours of injury, it is easier to dissect the soft tissue, the ligament is less retracted and the tissues hold sutures better [10]. Surgical repair is difficult if done more than three weeks after injury [6]. Scarring associated with an ulnar collateral ligament tear may look like an irregular area of decreased signal intensity, suggestive of a chronic ligamentous tear on MRI. In acute tear, edema around the ligament and fluid at the rupture site may facilitate the diagnosis [9].

In our case, axial MR images were very helpful in showing the minimally retracted fragment of the torn ligament. Coronal gradient-echo images with 2-mm slice thickness offered comparable resolution to T2-weighted TSE sequence in depiction of the ulnar collateral ligament status. There was no evidence of folded back fragment on the torn ligament itself on coronal 2-mm thick, gradient-echo images, suggesting a nondisplaced tear. The coronal MRI findings can be diagnostic for complete (vs. partial) tear and nondisplaced (vs. displaced) tear. However, it is not necessary to perform postoperative MRI if the patients’ symptoms have clinically improved. In follow-up MRI, gadolinium-enhanced fat-saturation images may not offer advantages in additional to gradient-echo images.

In summary, we present a case with MRI findings diagnostic for a skier’s thumb. Surgery confirmed a nondisplaced ulnar collateral ligament tear. Nine months after surgery, MRI showed an intact repaired ulnar collateral ligament beneath the adductor pollicis aponeurosis.

REFERENCES
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拇指尺骨外側韌帶斷裂之磁振造影表現：病例報告

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拇指尺骨外側韌帶斷裂並非罕見，但少有相關的磁振造影報告。我們報告一名46歲女性因交通意外受傷造成右拇指疼痛及失能，磁振造影（採用2-mm層厚）呈現右拇指尺骨外側韌帶斷裂後輕微回縮的殘餘韌帶纖維，但外展肌膜完整；對照正常的左拇指則清楚表現此韌帶的走向及完整性。手術發現右拇指尺骨外側韌帶在靠近外展肌膜近端處呈現非移位性斷裂，經縫補後9個月追蹤磁振造影顯示韌帶修復完好，病人症狀已大幅改善。

關鍵詞：尺骨外側韌帶，拇指，磁振造影