

Gamekeeper's Thumb with Stener Lesion in a High School Football Player: A Disablement Model Case Study

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ABSTRACT

This disablement model case study outlines a unique thumb pathology of a high school football player in his non-dominant hand and will detail the benefits of quick referrals for patient with extreme laxity and swelling around the 1st metacarpal. Initially, the patient presented with laxity of the 1st metacarpophalangeal joint and swelling along the 1st metacarpal. Radiographs showed floating bone fragments in the first metacarpophalangeal joint indicating Gamekeeper's Thumb, an acute injury to the 1st metacarpophalangeal ulnar collateral ligament, complicated by a Stener lesion, requiring surgical repair. The patient was scheduled for surgery in the following week and was casted for four weeks which posed many physical, occupational, and social problems. Many 1st metacarpal injuries may present similarly making it important to be familiar with the structure and function of the 1st metacarpal and metacarpophalangeal joint and concomitant injuries that may occur in the surrounding area. A Stener lesion is often missed due to the evaluator assuming that the injury is a basic 1st metacarpophalangeal ulnar collateral ligament sprain. The best way to rule in or out the involvement of a Stener lesion is by radiograph; therefore, it is in the best interest of the athlete to refer for a radiograph anytime a grade III ulnar collateral ligament sprain of the 1st metacarpophalangeal joint is suspected. Furthermore, the main purpose of this paper is to detail the importance of a quick referral when there is little to no ability to use the thumb and the effects the lack of movement can have on a young student-athlete.

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INTRODUCTION

Gamekeeper's Thumb, also known as Skier's Thumb, is an acute rupture of the ulnar collateral ligament (UCL) at the 1st metacarpophalangeal (MCP) joint of the hand and is a common injury among alpine skiers.¹ Repetitive valgus stresses, or forced hyperextension and abduction of the thumb, are the primary mechanisms of injury in the Gamekeeper's Thumb.¹ Gamekeeper's Thumb makes up 86% of all thumb injuries and occurs about 200,000 times a year globally.¹ The severity of the injury is characterized into three grades.¹ Grade I injuries occur when the UCL is stretched but still fully intact. A Grade II injury is a partial tear of the UCL, and a Grade III injury is the complete rupture of the UCL.¹ The UCL is composed of two ligaments, the Proper Collateral Ligament (PCL) and the Accessory Collateral Ligament (ACL), which are taught in different ranges of motion throughout the thumbs movement and helps ensure the stability of the 1st MCP joint on the ulnar surface.¹ The adductor pollicis muscle acts as the dynamic stabilizer of the thumb and attaches to the 1st proximal phalanx.¹ The UCL is most commonly injured at its distal attachment on the 1st proximal phalanx. A grade III injury to the UCL results in a bony avulsion fracture in about 20-30% of all similar pathologies.² The strong forces required to rupture this ligament can cause the ends of the UCL to retract and lay on the adductor pollicis, causing the UCL to become wedged in the MCP joint and hinder the joint's ability to be reduced or for the ligament to heal. This is known as a Stener lesion, which occurs in 64-87% of all grade III UCL injuries.^{2,3}

In acute injuries to the 1st phalange, patients may present with mild swelling, discoloration, and tenderness to palpation along the 1st metacarpal and MCP joint.² Applying a valgus force to the MCP joint, looking for excessive laxity when compared bilaterally, can test the integrity of the ligament.² If excessive movement at the MCP joint is present upon evaluation, a radiograph is indicated. In Gamekeeper's Thumb, the radiograph will typically show avulsed bony fragments displaced one millimeter or more away from the distal attachment site of the UCL.¹ If no avulsed bone fragments are seen, but Gamekeeper's Thumb is still suspected, the patient should be referred for Magnetic Resonance Imaging, or a high-resolution ultrasound for further imaging of the affected area.¹ Treatment of the area varies depending on the grade of the injury and whether or not the UCL was displaced. A displaced (folding over of the ligament onto the adductor aponeurosis) UCL requires surgical intervention to repair the injury, whereas a non-displaced injury would need to be immobilized for four to six weeks.¹ The rate at which the patient is seen for their injury has a major effect on how favorable their outcome may be; the longer the patient waits from the time of initial injury, the less likely it is that they will regain full function of that joint.

PATIENT INFORMATION

The patient was a healthy 18-year-old, male, high school football player who was in the middle of his first preseason game of the season, when he caught an interception and fell straight on his right hand forcing his thumb into hyperextension and abduction (**Figure 1**). The patient had no previous injuries to his dominant right hand.



Figure 1. Patient positioning during fall.

Differential Diagnosis and Evaluation

The patient complained of 6/10 pain and swelling along the 1st metacarpal and 1st MCP joint. Upon evaluation, he presented with tenderness to palpation along the 1st metacarpal and 1st MCP joint, a 1/5 manual muscle test (MMT) of the opponens pollicis, and a positive valgus stress test for laxity of the UCL. The patient was treated with ice and asked to return the following day for re-evaluation. The next day, he presented with increased pain and swelling along the 1st metacarpal and 1st MCP joint. The differential diagnoses consisted of 1st MCP joint UCL sprain, 1st metacarpal fracture, 1st proximal phalanx fracture, or opponens pollicis strain.

Body Structure and Function

The patient was tender to palpation along the 1st metacarpal and 1st MCP joint and presented with edema surrounding the 1st metacarpal and the muscle belly of the opponens pollicis. Compared bilaterally, he presented with a 1/5 MMT for opponens pollicis, testing for 1st MCP joint opposition, and tested positive for 1st MCP joint valgus stress test for laxity of the UCL.

Activity and Participation

The patient was a starting linebacker and kicker for his high school football team, as well as an elite soccer player. He was in his senior year at the time of injury and a member of a two-time reigning state football championship team who was relying on him for a victory three years in a row. A year prior, the patient

fractured the 3rd metacarpal on his opposite hand, benching him for most of the season. The patient stated that he was excited to get back to playing football this year and was hoping for an injury-free season. Sustaining an injury in the first preseason game of this season took a toll on the patient; he was worried that he would be letting his team down for the second year in a row, especially being the captain and leader of the team during his senior year. He also worried about how it would affect team morale and their ability to succeed in future games.

Environmental and Personal Factors

The patient had a previous history of a fracture in his left hand from an injury in football the previous year, which caused him to miss most of the season. Along with being upset about missing his senior year of high school football, the patient was also nervous on how this injury would affect his ability to do school work as he had injured his dominant hand. As a leader on the team and someone that people in the school looked up to, he felt as though he was letting people down as the hype of the new season was beginning. The preseason game was a tough loss for the team, and with the added stress of losing their starting linebacker he was unsure how people would react.

INTERVENTIONS

The injury occurred on the patient's dominant hand. Due to the increased swelling, pain, and loss of function after the initial evaluation and a history of trauma to the opposite hand, the patient was referred to a hand specialist for a second opinion and further imaging three days post-injury. Radiographs showed a rupture of the UCL with displaced bone fragments, indicating an avulsion from the proximal phalanx (i.e., Stener lesion), requiring surgical intervention. Surgery was scheduled for a week later, ten days post-injury. The surgery consisted of releasing the adductor aponeurosis and anchoring the avulsed UCL to its insertion with a Mitek suture by passing it through the ligament. Additional reinforcement was accomplished by repairing the aponeurosis. After the surgery, the patient was placed in a padded splint, with the thumb flexed and fully adducted, to keep his thumb immobile while swelling decreased before he was placed in a cast. A week after the surgery, the patient was placed in a hard cast for four weeks. Extra support around the thumb was applied within the cast to ensure that there was no movement and that the repaired ligament could heal; any excess movement of the thumb could result in failure of the surgery and loss of function in the thumb. While in the cast, the patient was able to participate in non-contact activities. As the team kicker and linebacker, the patient was still able to participate in football practice and games with a padded cast as the punter and place kicker. After four weeks, the patient was able to return to full contact as long as he wore a padded brace during games and practices. The patient returned to his starting position as linebacker and kicker for his high school football team with no additional rehabilitation.

OUTCOMES

Body Structure and Function

The patient had surgery on his hand within a week of the initial injury and was placed in a soft splint for one week and a hard cast for four weeks. The patient was right-handed; therefore, he was unable to use his dominant hand for five weeks. After the cast was removed, the patient tested 5/5 for the manual muscle tests for opponens pollicis, testing for opposition and had no laxity when the UCL was tested. The physician stated there was no need for rehabilitation, and the patient could return to normal activity as he saw fit. No patient-reported outcome measures were used during the patient's recovery. The patient denied having any pain but was nervous about re-injury upon returning to play and the potential to lose function of his thumb.

Therefore, the patient continued to wear the splint during activity for the remainder of the season. The splint was provided by the physician and padded by the athletic trainer for games and practices. The sports medicine staff at the school discussed the fear he was having and any underlying concerns he had about re-injury which also helped him overcome that fear.

Activity and Participation

The patient was removed from all contact participation in football practices and games but did not have to stop playing football altogether while he was recovering. Because of his position, he was able to participate in kick-off, field goal, and extra point attempts. In addition to playing football for his high school, he was also an elite soccer player for his high school. Realizing that he did not want to lose cardiovascular fitness during his off time from football, he focused on running to stay fit for both sports. Being able to stay interactive with the football team and focus on keeping up his fitness level was good for the mental health of this young player. He stated he enjoyed feeling like a part of the team on and off the field. Along with being beneficial to the patient, his hard work kept the spirits high for all of those still playing. Understanding that their teammate was working hard to get back and stay involved encouraged them to play hard and kept morale high until he was able to return to full participation.

Environmental and Personal Factors

Since writing was difficult, the school issued him a laptop to use to help complete his assignments in class and at home. Teachers also made accommodations, such as giving him more time to complete tests and assignments, to assist him. The school is competitive academically with high expectations for all students; missing a day of school can set the student far behind. The stress of having to miss a couple of days due to surgery and the inability to use his dominant hand was something the patient expressed worry about. After communicating with his teachers, he soon realized that they would not allow his injury to set him behind. He was able to stay up to date on all assignments and easily completed homework and notes with the use of the issued laptop.

DISCUSSION

Although a Gamekeeper's Thumb injury is common in some athletic events, this injury at this severity is not well known in the world of football causing athletic trainers in this role to be less familiar with the treatment. When treating a Gamekeeper's Thumb injury that has not been displaced, there is a possibility of a non-surgical option. When treating a Gamekeeper's Thumb injury in a non-surgical, more conservative method, the thumb is immobilized for 4-6 weeks in a plaster cast or splint in the position of slight flexion and ulnar deviation of the MCP joint with the 1st interphalangeal joint kept free for movement. When patients were asked if they preferred the cast or splint, most patients preferred the splint due to its superior comfort.⁶

Gamekeeper's Thumb complicated by a Stener lesion has likely occurred in this sport before; however, current literature reports minimal instances relating to football players. The treatment of this injury does not differ in that of a high school football player as opposed to a skier suffering from a similar injury. It is important, as athletic trainers, to identify the signs of a Gamekeeper's Thumb injuries and be able to take the appropriate steps in a timely manner. If a Stener lesion complicates the pathology, treatment and referral of the injury should be timely to avoid any further complications, such as weakness or loss of function.

An injury to the thumb that may seem insignificant at first glance can have a huge impact on a patient's life in athletics, the classroom, and daily life. Athletic trainers should be mindful of patient-centered care and take the time to identify interventions to assist making the injury and its complications less stressful.

CLINICAL BOTTOM LINE

The purpose of this case study is to inform health care professionals about a common injury such as the Gamekeeper's Thumb, with a not so common pathology like a Stener lesion, in an even less common patient population (high school football player). There is little documented evidence regarding Gamekeeper's Thumb in football players.^{1,2} The prevalence of a Stener lesion in a Gamekeeper's Thumb is low compared to the amount of injuries that are seen yearly, about 60% of all Gamekeeper's thumb injuries among athletes and everyday people are considered to be a grade III injury.^{1,2} The treatment of this type of injury is different than that of a typical Gamekeeper's Thumb injury and requires surgical intervention. Due to the in-depth evaluation of the patient by the athletic trainer the proper referral was made in a timely manner to catch this particular injury and help the patient regain all mobility of his thumb. Health care providers should be aware of this diagnosis and misdiagnosis of this injury could result in long-term complications in range of motion and strength.

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