

Post-traumatic Scapholunate Advanced Collapse of the Wrist: A Case Report



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ABSTRACT

Objective: The purpose of this report is to describe a patient with scapholunate advanced collapse (SLAC) of the wrist.

Clinical Features: A 38-year-old man presented to a chiropractic teaching clinic with right wrist pain after falling off of the tailgate of a truck 7 years prior. The mechanism of injury was a fall on an outstretched hand. Ultrasonography and radiography were performed, which demonstrated abnormal lunate kinematics and scapholunate interval diastasis associated with a clenched-fist maneuver. These findings were consistent with SLAC.

Intervention and Outcome: Following the diagnosis of SLAC, the wrist was splinted. Conservative care consisting of physical therapy included paraffin dips, therapeutic ultrasound, and stretching. The patient received only minimal alleviation of pain, and a surgical consultation was obtained. The patient elected surgical intervention, utilizing the proximal row carpectomy procedure.

Conclusion: This case demonstrates a patient with chronic wrist pain, with progression to carpal instability, which ultimately manifested as SLAC. We demonstrate, utilizing multiple imaging modalities, both preoperative and postoperative findings. To our knowledge, this is the first case to describe the use of diagnostic ultrasonography in the evaluation of the proximal row carpectomy procedure. (*J Chiropr Med* 2018;17:128-134)

Key Indexing Terms: *Wrist; Trauma; Ultrasonography*

INTRODUCTION

Scapholunate advanced collapse (SLAC) pattern of wrist arthritis was described in 1984, when Watson and Ballet reviewed 4,000 wrist radiographs and found degenerative arthritis in 210 cases and, of these, 57% were arthritis between the scaphoid, lunate, and radius.¹⁻⁴ Scapholunate ligament (SL) tears are the most common wrist ligament injury caused by rupture of the intrinsic ligament connecting the scaphoid to the lunate.^{5,6} Therefore, attenuation of the SL, whether traumatic or atraumatic in etiology, predisposes the wrist to eventual development of SLAC.⁷ Scapholunate ligament injury is the leading cause of SLAC of the wrist.^{8,9} If SLAC is a result of trauma, the mechanism

is most typically axial overload or hyperextension with supination or ulnar deviation.^{5,8,9}

Optimal treatment of symptomatic SLAC wrist should initially involve nonsurgical options.^{7,9,10} Symptomatic treatment (ie, splints, modalities, and injection) may be used.^{3,9,10} Surgical options are warranted though, whenever there is persistence of pain following treatment attempts utilizing conservative measures.⁹ Surgical treatment is planned on the basis of symptoms, physical examination findings, radiographic findings, stage of arthrosis, and the surgeon's preference.^{7,9,11} Scapholunate advanced collapse of the wrist is a pattern of degenerative wrist arthritis that was traditionally treated with total wrist arthrodesis.¹² Over the years, additional alternative surgical procedures have been introduced, which allow for better maintenance of the original wrist anatomic morphology and improved postsurgical range of motion (ROM).¹ Proximal row carpectomy (PRC) involves removal of the scaphoid, lunate, and triquetrum with creation of a new articulation between the capitate and the radius.^{10,12}

This report describes a 38-year-old man (co-author D.J.M.) with chronic right wrist pain who was diagnosed with SLAC initially through diagnostic ultrasonography (US). Multiple imaging modalities of both SLAC and PRC are presented. To our knowledge, there are no reported cases of US imaging in the postsurgical PRC.

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Case Report

A 38-year-old white man presented to a chiropractic teaching clinic with pain in his right wrist, focused at the lateral aspect of the scaphoid and paresthesia in digits 1 to 4, distally. The original mode of injury occurred 7 years earlier, when the patient was thrown from the tailgate of a vehicle moving approximately 20 mph, sustaining a fall on an outstretched hand, with injury to his right wrist. The greatest extent of pain was located along the dorsal aspect of the right wrist, described as a deep, throbbing pain. He presented to the emergency department, where a standard 4-view wrist series and an additional specialized scaphoid projection was performed. Radiographic evaluation of the right wrist revealed no signs of carpal fracture or joint instability. No further imaging was performed. The wrist was splinted and the patient was told to “give it time to heal.”

The patient then underwent physical therapy for the treatment of traumatic tendinopathy of the extensor compartment 3 times per week, for the first 2 months, which included paraffin dips, therapeutic ultrasound, passive and active ROM, and stretching. Frequency of treatment was gradually reduced as swelling decreased, and ROM improved. There was never full resolution of the symptoms, and there was persistent loss of ROM, with pain. He experienced pain in the wrist consistently over the next 7 years. The patient rated the pain from a 1 out of 10 to a 3 to 4 out of 10 on a numeric pain scale. The pain had been chronic, but recently flared up by the patient’s recent participation in the construction of a fence. This job required the use of a power drill, hand-held 2-man power auger, and lifting 80-lb fencing. The pain was consistent, dull, and achy. The paresthesia of his right hand was constant. The patient, at the time, was attending chiropractic college and experienced exacerbation of pain while performing adjusting maneuvers. He utilized active care with icing when needed, myofascial treatment, and kinesio taping of the forearm. He also received a chiropractic trial of care for 3 weeks, including carpal mobilization, but it provided limited relief. The right wrist pain was minimal in comparison to the asymptomatic left wrist.

The elevated levels of pain localized in the region of the radioscapoid joint, along the dorsal aspect of the right wrist. This acute escalation of pain prompted a US examination of the right wrist. It demonstrated scapholunate diastasis, and concurrent proximal migration of the capitate, upon performing a clenched-fist maneuver (Fig 1, Supplementary Video 1). Subsequent radiography of the right wrist was performed 2 days later, which again demonstrated diastasis of the scapholunate joint of 4.0 mm, associated with a clenched-fist maneuver (Fig 2). Both the US and radiographic findings were consistent with SLAC. Due to the complexity of internal derangement in the right wrist, magnetic resonance imaging (MRI) was ordered. A 2-compartment contrast MRI of the right wrist confirmed the diagnosis of SLAC. The MRI demonstrated

abnormal enhancement within the scapholunate joint, reinforcing the diagnosis of SL tear (Fig 3). This diagnosis prompted a consult with an orthopedic surgeon. Proximal row carpectomy was offered as a surgical intervention. The objectives of PRC were reduction of chronic pain, increased functional movement, increased ROM, and halting progressive arthritis of the radioulnar joint and carpal joints. The surgical approach included the removal of the scaphoid, lunate, and triquetrum bones of the right wrist.

Subsequent postoperative radiography and US imaging demonstrated migration of the distal row bones to the resected proximal row, creating a new articulation of the capitate and lunate fossa within the radioulnar joint (Figs 4 and 5). During the first 2 postoperative weeks, the right hand and forearm were in a ventral half cast with gauze, and an ace bandage was applied dorsally to allow for healing of the incision. The patient was instructed to move his fingers as much as possible during this time and ice the wrist and hand to tolerance. At that time, the pain was constant, the swelling was extreme, and the patient experienced paresthesia throughout the hand. Over the following 4 weeks, the wrist was splinted with a custom brace. Instructions were given for moving the fingers, clenching the fist, and ice to tolerance. In the following month, a custom brace was provided, and physical therapy consisting of Class IV laser treatments for the right wrist, instrument assisted muscle work, active and passive stretching, and squeezing a therapeutic stress ball were employed. Paresthesia was present in the right median nerve distribution. Sixty days following surgery, a right volar short arm resistive orthotic brace was prescribed to be worn for 8 hours each day in the extension position and 1 hour each day in the flexion position, for a duration of 2 months. At the last follow-up, the patient experienced minimal pain, with full resolution of his paresthesia, and no functional limitations in his activities of daily living. Patient consent to utilize radiological imaging or other clinical information relating to the case was obtained prior to publication of this case report.

DISCUSSION

Scapholunate advanced collapse is the most common type of degenerative arthritis in the wrist.^{2,4,8,9,13} The cause of SLAC is usually thought to be traumatic injury to the SL; however, the differential diagnosis of SLAC includes idiopathic osteonecrosis (Kienböck’s disease and Preiser’s disease), infection, scaphotrapeziotrapezoid arthritis, inflammatory arthritis, scaphoid nonunion advanced collapse, calcium pyrophosphate deposition disease, and pseudogout have been reported in association with SLAC.^{3,7-9,14,15}

Symptomatology ranges from debilitating wrist pain with reduction in grip strength and ROM to asymptomatic patients, where the finding is merely incidental.⁷ Asymptomatic SLAC wrist generally does not require treatment; however, there are no studies on the long-term success of

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