SCIENTIFIC ARTICLE

Scapholunate Dissociation With Radiolunate Arthritis Without Radioscaphoid Arthritis

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Purpose Watson and Ballet introduced the concept of a direct association between scapholunate (SL) dissociation and radioscaphoid (RS) arthritis with preservation of the radiolunate (RL) articulation in 1984. This principle has served as the anatomic, biomechanical, and pathophysiological basis for reconstructive surgery in the carpus. Recently, we have noted cases of concurrent SL dissociation and RL arthritis without RS arthritis, which is contrary to the accepted concept of wrist arthritis due to SL advanced collapse. The purpose of this study was to determine whether Watson and Ballet's thesis that SL dissociation results in RS joint degeneration with sparing of the RL joint can be confirmed, or whether another joint degeneration pattern can be associated with SL dissociation.

Methods The 3 authors independently reviewed 897 radiographs of the wrist in 691 male patients (206 bilateral and 485 unilateral) with diagnosis codes of wrist osteoarthritis (715.13), wrist instability (718.83), and wrist sprain (842.00). Posterior-anterior, oblique, and lateral views were available for all wrists. Elements assessed were RS joint, RL joint, SL joint, midcarpal joint, ulnar variance, ulnolunate joint, SL angle, and lunocapitate angle.

Results There were 146 wrists with radiographic SL dissociation. Nine wrists in 6 patients had radiographic SL dissociation and RL arthritis but no RS arthritis. An additional 6 wrists in 6 patients had radiographic RL arthritis but no SL dissociation or RS arthritis; however, 5 of these did have an SL angle of 60° or greater.

Conclusions Our results show that RL arthritis can occur in association with SL dissociation, and that the generally held view that the RL articulation is spared in SL advance collapse is not universally true. Consequently, it is our recommendation that both the RL and RS joints should be carefully evaluated for degenerative changes when planning treatment for patients with SL dissociation, because it should not be assumed that the RL joint has been spared. *(J Hand Surg 2010;35A:1075–1081. Copyright © 2010 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Radiolunate arthritis, scapholunate dissociation, carpal instability, SLAC wrist.

Watson and Ballet first introduced the concept of scapholunate (SL) dissociation and radioscaphoid (RS) arthritis with preservation of the radiolunate (RL) articulation in 1984 in the classic article on SL advanced collapse (SLAC wrist).[1] The authors wrote that the RL joint was "almost never involved" and that the RL joint "appears to be spared" and was "observed to be intact even in advanced cases of degenerative arthritis." In 1986, Watson and Ryu described the spherical relationship between the radius and lunate as protecting the "radius-lunate joint, even in the end stages of the most advanced forms of SLAC."[2]

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The authors described SLAC wrist as having 3 stages: (1) degenerative changes between the scaphoid and the radial styloid, (2) degenerative changes at the rest of the RS joint, and (3) degenerative changes at the capitolunate joint. Based on sparing of the RL articulation, Watson and Ballet proposed treating SLAC wrist with scaphoid excision, silicone scaphoid replacement, and arthrodesis of the lunate-capitate-hamate-triquetrum joints.[1]

Subsequent authors have continued to espouse the principle that the RL articulation is spared from degenerative change in wrists in which SL dissociation is the presumed incipient cause.[3–5] It is accepted, however, that the RL joint is not necessarily spared in cases of ulna positive variance and ulna-lunate impaction.[6]

In the everyday treatment of patients for wrist pain, we have observed that some patients have radiographic findings precisely contrary to those described by Watson and Ballet.[1] We have encountered patients whose wrists show radiographic evidence of RL arthritis and concurrent SL dissociation, but with no narrowing of the RS joint space.

To investigate further, we reviewed retrospectively all wrist radiographs of male patients obtained over a 4-year period in the course of their evaluation in the office. Our null hypothesis is that radiographic evidence of RL arthritis does not appear in patients with SL dissociation because, as Watson and Ballet[1] wrote, the RL articulation is spared. The purpose of this study was to determine whether Watson and Ballet's thesis that SL dissociation results in RS joint degeneration and sparing of the RL joint, or whether another pattern exists in patients with SL dissociation.[1]

MATERIALS AND METHODS

Between January 1, 2005, and April 30, 2009, we obtained 3109 wrist radiographs in the course of evaluating and treating adult patients in a private hand surgery and orthopedic surgery practice. All male patients with diagnosis codes of osteoarthritis of the wrist (715.13), instability of the wrist (718.83), and wrist sprain (842.00) were identified by medical record number. We found 691 male patients with the corresponding diagnosis codes and reviewable wrist radiographs. The 3 authors independently examined a total of 897 radiographs of the wrist in 691 male patients (206 bilateral and 485 unilateral).

Radiographic criteria were established before reviewing the radiographs. Areas assessed were: RS joint space, RL joint space, SL distance, ulnar variance, lunocapitate (LC) joint space, ulna lunate joint space, and other notable findings such as subchondral cysts. All radiographs available were reviewed for each wrist. Posterior-anterior, oblique, and lateral views were available for all wrists. Posterior-anterior power grip views in pronation were often available, as were other views, such as Bett's view and the scaphoid view. Unanimous agreement among the 3 authors was required for a joint to be considered narrowed. Ulnar variance was determined using the method of perpendiculars, in which a line is drawn ulnarly from the distal volar aspect of the radius, perpendicular to the longitudinal axis of the radius. The space between the line and the distal end of the ulna articular surface was measured using the picture archiving and communication system (PACS) caliper tool (Stryker Corporation, Kalamazoo, MI). When available, power grip posteroanterior radiographs in pronation were used to determine ulnar variance. When not available, routine posteroanterior images were used.

Excluded from consideration were wrists that showed evidence of prior fracture (distal radius or carpal bone), pancarpal arthritis, marked ulna positive variance in which the RL arthritic changes were obviously secondary to ulnolunate impaction, Kienböck's disease, dysplastic distal radius (Madelung's deformity), rheumatoid arthritis, psuedogout, and other generalized disorders.

Wrists that showed RL arthritis were additionally examined for SL angle, LC angle, and status of the midcarpal joint. We did not review radiographs of female wrists because (1) we believed that the yield would be low, (2) the purpose of the study was to confirm or rule out the existence of RL degenerative changes in patients with SL dissociation rather than to report the incidence in the male and female populations, and (3) there were practical resource limitations.

All radiographic images were stored on a digital PACS system that permitted high-power magnification of images, precise measurement of SL dissociation with the caliper tool, measurement of angles with the goniometer tool, and easy retrieval of images for additional review. The 3 reviewers were blinded to each other's assessment until all images were reviewed. Radiographs identified as having notable changes were then reviewed jointly with the senior author.

This study was approved by our health system institutional review board. The study was self-funded.

RESULTS

SL dissociation

There were 146 wrists that revealed evidence of SL dissociation, defined as an SL gap of 3 mm or more as measured by the caliper tool on the digital PACS sys-