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Wrist Osteoarthritis*Leo M. Rozmaryn, MD***Synonyms**

Degenerative arthritis
 Osteoarthritis
 Osteoarthritis of the
 distal radial ulna joint
 Degenerative joint
 disease
 Carpal collapse
 Carpal arthrosis

ICD-9 Codes

715.14
 Osteoarthritis, primary,
 localized to the hand
 715.24
 Osteoarthritis, secondary,
 localized to the hand
 715.94
 Osteoarthritis,
 unspecified, localized to
 the hand

Definition

Degenerative arthritis in the wrist is a final common pathway to destruction, usually stemming from a previous injury. Such injuries include fractures of articular surfaces, ligamentous destruction, and articular cartilage destruction. There are two fundamental patterns:¹ (1) scapholunate advance collapse (SLAC) and (2) triscaphe arthritis. SLAC of the wrist usually occurs as a late sequela due to a scaphoid fracture malunion or scaphoid lunate dissociation. Triscaphe arthritis is located near the base of the thumb and can occur as a result of local trauma. The natural history of SLAC includes a pattern of progressive radial carpal and intercarpal arthritis.

Symptoms

Symptoms usually include radial-side wrist pain, localized swelling, progressive stiffness to wrist flexion/extension, and forearm pronation and supination. There may be weakness of grip. Symptoms are usually increased in the morning, with increased range of motion as the day progresses. The course may be indolent or rapidly progressive.

Physical Examination

There is usually radial-side wrist or distal radial ulna joint tenderness and pain with motion; swelling; and limitation of movement in flexion/extension, radial ulna deviation, and/or forearm pronation and supination. There is weakened grip and pinch strength, and there may be a joint effusion. The patient is more likely to report pain at the extremes of movement rather than throughout the entire range. The presence of limited flexion and extension depends on whether the radial carpal and midcarpal joints are involved. Greater involvement of the radial carpal joint produces decreased wrist flexion, whereas involvement of the midcarpal joint produces diminution in extension range of motion.

Functional Limitations

Functional limitations include a sense of stiffness, weak grasp, and pain with movement of the wrist, impeding the ability for manual exertion and positioning of the hand for fine motor coordination. There is a progressive limitation in activities of daily living.

Diagnostic Studies

The first and most common diagnostic modality is the plain x-ray. Characteristic findings include joint space narrowing; subchondral sclerosis; osteophyte formation; and degenerative cysts occurring in the SLAC pattern, triscaphe arthritis pattern, or isolated distal radial ulna joint pattern. In the first two patterns the radiolunate joint may be spared (Fig. 1). Radioscaphoid arthritis begins at the radial styloid and progresses proximally. In arthritis caused by scapholunate dissociation, the gap between the scaphoid and lunate widens and the capitate pushes down as a wedge between them, eventually reaching the radius. Triscaphe arthritis expresses itself as a localized narrowing between the scaphoid trapezium and trapezoid articulations.

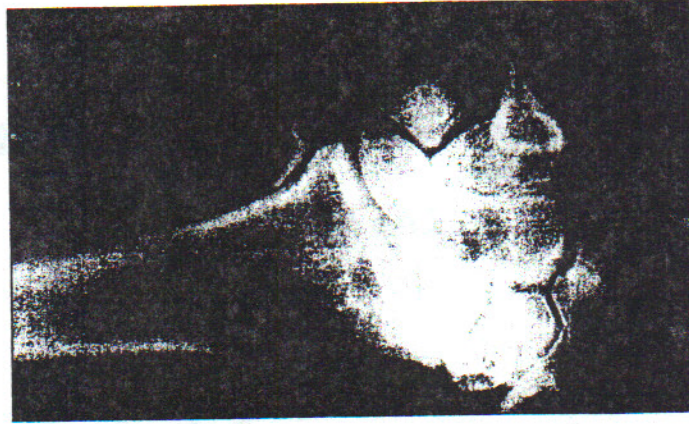


FIGURE 1. Osteoarthritis of the radial scaphoid articulation characteristic in SLAC wrists. Notice this near disappearance of the scaphoid, beaking of the radial styloid, subchondral sclerosis and cyst formation, relative sparing of the distal radial ulna joint, and the radiolunate articulation.

Differential Diagnosis

Inflammatory arthritis (e.g., Lyme disease)

Gout

Rheumatoid arthritis

Psoriatic arthritis

Calcium pyrophosphate deposition disease

Septic arthritis

Systemic lupus erythematosus

Scleroderma

Treatment

Initial

Initial treatment generally involves splinting the wrist in neutral or within 5 degrees of flexion or extension. This is usually accomplished with a light Thermanite splint that is worn during periods of heavy or strenuous use. The wrist should be removed from the brace several times a day for gentle active and passive range-of-motion exercise, usually in hot water, alternating with cold water in a heat, stretch, ice sequence. The judicious use of nonsteroid anti-inflammatory drugs (NSAIDs), including cyclooxygenase-2 (COX-2) inhibitors, and the avoidance of heavy strenuous activity whenever possible are important. Recent use of oral chondroitin sulfate² and glucosamine has shown promise.

Rehabilitation

Rehabilitation by a therapist knowledgeable in treating hand disorders can be helpful. The following treatment is advocated: (1) active range-of-motion exercise; (2) passive stretching; (3) joint mobilization techniques through pain-free ranges of motion; (4) strengthening of wrist musculature and grip, beginning with static exercise and progressing to dynamic exercise with resisted movement; (5) functional activities in therapy and at home to facilitate range of motion, grip function, fine motor coordination; (6) the judicious use of modalities available in physical and/or occupational therapy

settings, including heat, ultrasound, electrical stimulation, and ice to decrease pain, inflammation, edema, and increase mobility; and (7) the use of work hardening when appropriate.

Scaphoid Trapezium Trapezoid Postoperative Rehabilitation

The postoperative regimen includes 8 to 10 weeks of immobilization until fusion is complete, and then progressive active and passive range-of-motion exercises are initiated in a flexion extension plane radial ulna deviation and in pronation and supination planes.

Intercarpal and Radial Carpal Postoperative Rehabilitation

The postoperative regimen for wrist reconstruction depends entirely on the nature of the procedure performed. For soft tissue reconstructions that use pins to temporarily fix the radiocarpal or intercarpal joints while the soft tissue elements stabilize, the pins usually remain in place between 8 to 12 weeks. After removal of the pins, the wrist is mobilized by both active and passive range-of-motion exercises. Strengthening is begun almost immediately and continued for another 3 months. Functional and job retraining can begin at that time as well. Baseline function is not expected to return for at least 6 to 8 months.

For wrist arthrodesis with current plate technology, mobilization of the hand can begin immediately, and once the sutures are removed, full functional retraining and strengthening can commence. Additionally, wrist arthrodesis does not include the distal radio-ulnar joint, and full pronation and supination of the forearm can be expected.

Postoperative function remains a concern. While most patients can return to their original job, they need to modify their grips in order to do so. Perineal care and hand manipulation in tight spaces remain the most difficult tasks.

Procedures

The sparing use of intra-articular injected corticosteroid is a useful adjunct. A good rule of thumb is no more than three injections in a year and no more than one injection during a 3-month period. Intra-articular injection of Hyalgan also shows promise.

Surgery

Scaphoid Trapezium Trapezoid Surgery

The ideal treatment of symptomatic scaphoid trapezium trapezoid osteoarthritis is scaphoid trapezium trapezoid (STT) fusion.³ These fusions are effective methods of maintaining overall carpal height and preventing carpal collapse. The disadvantage of intercarpal arthrodesis is that an alteration of normal wrist function occurs with a loss of approximately 50% of flexion and extension. With increased stress placed around adjacent joints, arthritis may progress in these other articulations; thus the overall rate of progressive radial carpal arthritis is 33%. Alternatives to STT fusion are trapezium excision and ligamentous reconstruction, or arthroplasty with trapezoid joint interposition.⁴ This also prevents subsequent thumb metacarpal trapezium arthritis.

Intercarpal and Radial Carpal Surgery

In a SLAC wrist, there often is a normal radial lunate and midcarpal joint. In that case, excision of the scaphoid followed by capitulate arthrodeses or a four-corner fusion (capitate lunate hamate triquetrum) addresses the radial scaphoid and possible capitulate arthritis.⁵ Most patients have a good to excellent result, with preservation of approximately 50% of motion in the flexion extension plane and 80% in the radial ulna deviation plane, as well as 80% of grip strength compared with the other side.⁶

Salvage procedures for symptomatic SLAC wrists and other osteoarthritic conditions that affect the radial carpal intercarpal joint include proximal row carpectomy and total wrist fusion. After this procedure, patients have excellent range of motion, ranging from 80 degrees to 94 degrees,

with preservation of about 50% of grip strength.⁷ In other studies, flexion extension arc averaged 61% of the other wrist, and grip strength averaged 80% of the other side.⁸ The ultimate salvage for wrist osteoarthritis is total wrist arthrodesis.⁹ This procedure has excellent reliability in terms of pain relief and durability and offers the patient upper strength that can be used for repetitive activities and heavy labor. The disadvantages of this fusion is that wrist flexion extension, radial and ulna deviation movements are eliminated. However, patients can pronate and supinate their forearms. Modern design of wrist fusion internal fixation plates have shortened the recovery and immobilization times. Usually, splints can be discontinued at 6 to 8 weeks. Finger and thumb movement normally can be begun immediately, and pronation and supination can start in 3 weeks, with the patient in a short arm cast.

Total Wrist Arthroplasty

During the past 15 years, much discussion has taken place about total wrist arthroplasty made of either a single silicone unit or a composite utilizing the same types of metal and plastic materials used in total knee replacement. Although the short-term results are excellent in terms of range of motion of the wrist and pain relief, there have been long-term problems with loosening of these prostheses.¹⁰

Potential Disease Complications

The history of this condition is the progression to joint ankylosis or autofusion, at which point movement differs from surgical arthrodesis in that the position of the joint may assume is predictable and may not be of functional use to the patient. By the time this stage is reached there is virtually no pain; however, pain can be protracted for a long period.

Potential Treatment Complications

Analgesics, NSAIDs, and COX-2 inhibitors have well-known side effects that most commonly affect the gastric, hepatic, and renal systems. Potential treatment complications include operative infection, hardware failure, nonunion of arthrodeses, and severe silicone synovitis. This form of synovitis can invade into surrounding bone structure, causing gross destruction of bone. Bilateral wrist arthrodesis can be quite disabling, and differing positions of arthrodesis may have to be used to allow the patient to address personal hygiene and activities of daily living.

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