

University of Massachusetts Medical School  
**eScholarship@UMMS**

---

Open Access Articles

Open Access Publications by UMMS Authors

---

2018-11-14

## Wrist Arthritis

Hossein Akhondi  
*University of Nevada*

*Et al.*

Let us know how access to this document benefits you.

Follow this and additional works at: <https://escholarship.umassmed.edu/oapubs>

 Part of the [Musculoskeletal Diseases Commons](#), and the [Rheumatology Commons](#)

---

### Repository Citation

Akhondi H, Panginikkod S. (2018). Wrist Arthritis. Open Access Articles. Retrieved from <https://escholarship.umassmed.edu/oapubs/3646>

Creative Commons License



This work is licensed under a [Creative Commons Attribution 4.0 License](https://creativecommons.org/licenses/by/4.0/).

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in Open Access Articles by an authorized administrator of eScholarship@UMMS. For more information, please contact [Lisa.Palmer@umassmed.edu](mailto:Lisa.Palmer@umassmed.edu).

NCBI Bookshelf. A service of the National Library of Medicine, National Institutes of Health.

StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2018 Jan-.

## Wrist Arthritis

### Authors

Hossein Akhondi<sup>1</sup>; Sreelakshmi Panginikkod<sup>2</sup>.

### Affiliations

<sup>1</sup> University of Nevada

<sup>2</sup> University of Massachusetts Medical School

Last Update: November 14, 2018.

## Introduction

Arthritis means inflammation of the joint. Symptoms of arthritis includes pain, swelling, redness, stiffness and loss of motion of the involved joint. Wrist arthritis can affect multiple functions of daily life and hence acknowledging its causes, seeking proper diagnosis, and finding effective long-term treatments are necessary to avoid disability.

## Etiology

According to the American Academy of Orthopedic Surgeons (AAOS), three primary types of arthritis affect the human wrist: osteoarthritis, rheumatoid arthritis, and post-traumatic arthritis.[1]

1. Osteoarthritis (OA): This is a common cause of wrist pain in the elderly population although it can affect any age group. Aging, hereditary factors, high BMI, joint anatomy and gender are the risk factors linked to the development of osteoarthritis. In young adults, it usually happens secondary to preceding joint injury.
2. Rheumatoid arthritis (RA) is an inflammatory condition which affects the peripheral joints symmetrically. The exact etiology of rheumatoid arthritis remains unknown, but it is thought to be multifactorial.[2][3]
3. Post-traumatic arthritis develops because of traumatic events such as injuries to the ligaments or fracture of the wrist bones. Despite adequate treatment, damage to the bones increases the risks of developing arthritis over time[4]. It usually affects the victim many years after the initial injury.

Other causes include infection, crystal-induced arthritis, reactive arthritis, and systemic diseases like sarcoid arthropathy, myelodysplastic and leukemic disorders.

Osteoarthritis occurs when the soft and slippery articular cartilage covering the bones at the end of the wrist wear away with time, making the cartilage rough and stiff and unable to heal because of limited blood supply (AAOS, 2018). The degeneration of the cartilage causes rubbing between bones that result in pain and stiffness. This is a disease of the elderly although it can affect any age group. In young people, it is usually from secondary causes as opposed to primary wear and tear.

## Epidemiology

Although the wrist is not a weight-bearing joint, it has a significant function in day-to-day activities, and that predisposes it to trauma and arthritis. One in seven persons in the United States has wrist arthritis (13.6%) by one estimate. This could also be due to the frequency with which RA affects the wrists. The prevalence of RA affecting the wrist is 2.5 million people in the United States and approximately 75% in the general population. It affects one wrist joint in 30% of patients, but the condition then progresses to become bilateral in 95%. Gout affects the wrist in 0.28% of the population.[5]

## Pathophysiology

Pathophysiology of wrist arthritis depends on arthritis. Here, we are briefly mentioning the pathophysiology of the most common types.

- Osteoarthritis previously thought to be due to wear and tear has a more complex pathogenesis. Some factors involved are biomechanical factors, proteases like several matrices metalloproteinases (MMPs), cysteine proteinases and serine proteinases and proinflammatory cytokines.
- Rheumatoid arthritis results from a complex interaction between genetic and environmental factors that leads to a breakdown of immune tolerance and synovial inflammation.
- In post-traumatic osteoarthritis, the mechanics of the wrist and ligaments will change, and loading factors are redirected or misdirected resulting in damage of cartilage and promote osteoarthritis.

## History and Physical

The most common manifestation of wrist arthritis is the pain. It is a localized or diffuse pain. Arthritis pain is more diffuse in the whole wrist joint. The character of the pain varies depending on arthritis. For example, pain due to osteoarthritis is worse with joint use and is relieved by rest. Clinicians often associate pain in rheumatoid arthritis with a stiffness which is worse in the morning and gets better as the day goes by. Symmetric involvement of the joints is more commonly a manifestation of rheumatoid arthritis. Swelling may be present due to effusion or synovial hypertrophy. Redness and warmth of the joint along with swelling in a non-traumatic wrist joint suggests inflammation or infection. Patients will also complain of limitation between motion and can even subjectively feel weakness.

Constitutional symptoms like fevers, chills, fatigue, night sweats, and weight loss suggest a systemic cause. The systemic cause could be a systemic rheumatological disease, malignancy or septic arthritis.

Physical examination includes inspection, palpation and special tests.

**Inspection:** Swelling and deformities are the two important findings associated with arthritis. Regarding swelling, it is important to distinguish between a joint effusion from a tenosynovitis or a localized mass. Arthritis usually produces a diffuse circumferential swelling. Chronic inflammation in diseases like rheumatoid arthritis can cause deformities like volar subluxation of the carpus, carpal collapse, and radial deviation of the carpus. It can also result in instability with dorsal subluxation of the ulnar head, which causes "piano key" like movement with downward pressure.

**Palpation:** Palpation helps in identifying the specific area affected by the underlying pathology. The wrist is best palpated in slight flexion and feeling the dorsal surface of the wrist with the thumb while supporting the wrist with the fingers of both the hands. Dorsal instability is a sign of joint effusion. Instability can be tested by looking for transmission of pressure from one hand placed at one side of the joint to the second hand placed on the opposite side.

Clinicians should test the active range of motion first: They should attempt if there is any limitation, to look for any improvement. The range of motion tested is flexion, extension, radial, and ulnar deviation. The normal range of flexion is 65 to 80 degrees, extension 55 to 75 degrees, ulnar deviation 30-45 degrees and radial deviation 15 to 25 degrees.

**Special tests:** I use Special tests like the Tinel sign, Carpal compression test, Phalen test, Finkelstein test, etc in excluding causes other than arthritis in a patient with wrist pain.

A wrist joint examination is complete only after an examination of the elbow (joint above) and the hand joints (joint below).

## Evaluation

Evaluation begins with a complete history including the onset of symptoms, location, nature, duration, aggravating and easing factors. If the pain is chronic, we should enquire triggers causing recent exacerbations. A complete physical examination as outlined above will guide the clinician in ordering the appropriate diagnostic tests. The

diagnosis of osteoarthritis is clinical, however, imaging modalities can confirm the presence and severity of osteoarthritis.

Conventional radiography is the most widely used imaging modality and allows for detection of characteristic features of OA including marginal osteophytes, joint space narrowing, subchondral sclerosis, and cysts. Someone might consider joint space narrowing a measure of cartilage loss although this is not absolute. The problem is that conventional X-rays are not sensitive for osteoarthritic changes, particularly in early disease. In such cases, X-rays correlate poorly with symptoms. Older people who lack clinical symptoms can have osteoarthritic changes in the X-ray.

MRI is unnecessary for most patients with symptoms suggestive of OA and/or typical radiographic features. However, it can identify OA at earlier stages of the disease before radiographic changes become clear. These changes include cartilage defects and bone marrow lesions. MRI can also assess pathology in other structures of the joint not visualized by radiography such as synovium and ligaments.[6][7] The role of CT is rather limited.

Physicians have also used ultrasonography with varying success. It is unhelpful in checking the bones or deep parts of the joints and operator-dependent, but it might show OA-associated structural changes and is useful for detecting synovial inflammation, effusion, and osteophytes.[8][9]

A bone scan can show areas of increased uptake and confirm pathology and its location, but it is not specific for any one entity. Confirmation of a specific diagnosis is hard with bone scan alone.

Orthopedic surgeons have used arthroscopy in the diagnosis, to examine the joint and synovium and get biopsies.[10]

In the rare case that someone needs synovial fluid analysis, it shows a non-inflammatory or mildly inflammatory pattern with less than 2000 white blood cells/mm, predominantly mononuclear cells. It will be colorless or yellow fluid with good viscosity. Usually, the reason to get synovial fluid is to rule out infectious arthritis.[11]

Radiographs starting with regular X-rays and followed by more specialized tests like computed tomography (CT) and magnetic resonance imaging (MRI) give more details of the disease and rule out other etiologies.[12]

## Treatment / Management

Non-surgical management comprises changing daily activities, immobilizing joints with wrist splints especially during daytime and work for several weeks, NSAIDs and analgesic medications, physical therapy and exercise, and local corticosteroid injections. Systemic steroids have no role and should be avoided. For RA, biological medications are helpful in the same manner they help other joints. There is no permanent cure. Pills containing hyaluronic acid and glucosamine are ineffective and have a placebo effect.[13]

Surgical treatment is indicated when disabling pain emerges despite conservative and non-surgical treatments. There are many surgical approaches available, like wrist denervation, ulnar resection (removes the pressure from wrist), or synovectomy, but the ones used most often include proximal row carpectomy, wrist fusion, and wrist replacement (AAOS, 2018).

Proximal row carpectomy involves the removal of the three carpal bones close to the forearm to ease pain and sustain wrist motion. Fusion or desis is a welding process that removes the damaged cartilage and attaches wrist bones to make sure they heal as a single and solid bone that does not cause pain. Fusion will reduce the range of motion but eliminate the pain. Arthrodesis can be limited or total. In wrist replacement, the surgical procedure involves the removal of the damaged wrist cartilages and bones and replacement with plastic/metal joint. The goal is to restore function, regain range of motion and reduce the pain. The implants have not resulted in gratifying results such as those with knee or hip replacement.[14][15][16]

One must treat early synovitis with medical means and anti-inflammatories; if they fail, one needs surgical intervention to prevent complications such as tendon ruptures. Surgeons have used Synovectomy for decades, but it is

most helpful when considerable synovitis is present, like in RA or psoriatic arthritis. The effects on OA are not significant.

Arthroscopic procedures are more helpful in diagnosis than in treatment if someone needs them.[17] They show the articular surfaces and can remove loose bodies and do synovial biopsies. They are more useful in the early phases of arthritis. Synovectomy can be done through an arthroscope.

Wrist arthrodesis is the gold standard of surgical treatments.[18]

## Differential Diagnosis

Besides wrist arthritis, one should consider the following differentials during the evaluation of wrist pain.

- Peri-articular: Tenosynovitis including De Quervain tenosynovitis, pigmented villonodular tenosynovitis, acute calcific peri-arthritis and ganglion
- Bone lesions: Fractures, neoplasms, infection, osteonecrosis like Kienbock disease (avascular necrosis of the lunate bone) and Presler disease (scaphoid bone)
- Neurologic: Nerve entrapment syndromes particularly carpal tunnel syndrome and ulnar nerve entrapment in the Guyon canal.
- Vascular: Scleroderma and occupational vibration syndromes
- Referred pain: Cervical spine disorders and reflex sympathetic osteodystrophy

## Enhancing Healthcare Team Outcomes

Wrist arthritis can challenge in terms of both diagnosis and management. Since hand motions are essential for many higher functions of humans, clinicians must pay close attention to detail to address the issue in a time sensitive manner to prevent disability. One should consider a multidisciplinary approach involving rheumatologists, orthopedic surgeons, physical and occupational therapists whenever appropriate.

## Questions

To access free multiple choice questions on this topic, [click here](#).

## References

1. Samanta M, Mitra S, Samui PP, Mondal RK, Hazra A, Sabui TK. Evaluation of joint cartilage thickness in healthy children by ultrasound: An experience from a developing nation. *Int J Rheum Dis*. 2018 Aug 30; [PubMed: 30168276]
2. Ben Achour W, Bouaziz M, Mechri M, Zouari B, Bahlous A, Abdelmoula L, Laadhar L, Sellami M, Sahli H, Cheour E. A cross sectional study of bone and cartilage biomarkers: correlation with structural damage in rheumatoid arthritis. *Libyan J Med*. 2018 Dec;13(1):1512330. [PMC free article: PMC6127838] [PubMed: 30160204]
3. Burgers LE, Ten Brinck RM, van der Helm-van Mil AHM. Is joint pain in patients with arthralgia suspicious for progression to rheumatoid arthritis explained by subclinical inflammation? A cross-sectional MRI study. *Rheumatology (Oxford)*. 2018 Aug 21; [PubMed: 30137540]
4. Kurdi AJ, Voss BA, Tzeng TH, Scaife SL, El-Othmani MM, Saleh KJ. Rheumatoid Arthritis vs Osteoarthritis: Comparison of Demographics and Trends of Joint Replacement Data from the Nationwide Inpatient Sample. *Am J Orthop*. 2018 Jul;47(7) [PubMed: 30075040]
5. Guo Q, Wang Y, Xu D, Nossent J, Pavlos NJ, Xu J. Rheumatoid arthritis: pathological mechanisms and modern pharmacologic therapies. *Bone Res*. 2018;6:15. [PMC free article: PMC5920070] [PubMed: 29736302]
6. Lotz MK, Kraus VB. New developments in osteoarthritis. Posttraumatic osteoarthritis: pathogenesis and

- pharmacological treatment options. *Arthritis Res. Ther.* 2010;12(3):211. [PMC free article: PMC2911903] [PubMed: 20602810]
7. Song Y, Zhu F, Lin F, Zhang F, Zhang S. Bone quality, and the combination and penetration of cement-bone interface: A comparative micro-CT study of osteoarthritis and rheumatoid arthritis. *Medicine (Baltimore)*. 2018 Aug;97(35):e11987. [PubMed: 30170401]
  8. Romanowski MW, Majchrzak M, Kostiukow A, Malak R, Samborski W. Effect of Manual Therapy on Pain Sensation and Hand Dexterity and Grip Strength in a Patient with RA. Didactic Case Study. *Ortop Traumatol Rehabil.* 2018 Apr 30;20(2):157-162. [PubMed: 30152777]
  9. Gaspar MP, Pham PP, Pankiw CD, Jacoby SM, Shin EK, Osterman AL, Kane PM. Mid-term outcomes of routine proximal row carpectomy compared with proximal row carpectomy with dorsal capsular interposition arthroplasty for the treatment of late-stage arthropathy of the wrist. *Bone Joint J.* 2018 Feb;100-B(2):197-204. [PubMed: 29437062]
  10. Adams BD. Surgical management of the arthritic wrist. *Instr Course Lect.* 2004;53:41-5. [PubMed: 15116599]
  11. Sammer DM, Shin AY. Comparison of arthroscopic and open treatment of septic arthritis of the wrist. Surgical technique. *J Bone Joint Surg Am.* 2010 Mar;92 Suppl 1 Pt 1:107-13. [PubMed: 20194349]
  12. Field J, Herbert TJ, Prosser R. Total wrist fusion. A functional assessment. *J Hand Surg Br.* 1996 Aug;21(4):429-33. [PubMed: 8856527]
  13. Kistler U, Weiss AP, Simmen BR, Herren DB. Long-term results of silicone wrist arthroplasty in patients with rheumatoid arthritis. *J Hand Surg Am.* 2005 Nov;30(6):1282-7. [PubMed: 16344189]
  14. Chen JH, Huang KC, Huang CC, Lai HM, Chou WY, Chen YC. High power Doppler ultrasound score is associated with the risk of triangular fibrocartilage complex (TFCC) tears in severe rheumatoid arthritis. *J. Investig. Med.* 2018 Aug 29; [PubMed: 30158166]
  15. Aizenberg E, Ten Brinck RM, Reijnierse M, van der Helm-van Mil AHM, Stoel BC. Identifying MRI-detected inflammatory features specific for rheumatoid arthritis: two-fold feature reduction maintains predictive accuracy in clinically suspect arthralgia patients. *Semin. Arthritis Rheum.* 2018 May 01; [PubMed: 29853189]
  16. Vermaak PV, Southwood TR, Lindau TR, Jester A, Oestreich K. Wrist Arthroscopy in Juvenile Idiopathic Arthritis: A Review of Current Literature and Future Implications. *J Wrist Surg.* 2018 Jul;7(3):186-190. [PMC free article: PMC6005783] [PubMed: 29922493]
  17. Grenho A, Arcangelo J, Jordão P, Gouveia C. Carpal synovitis with capitate bone tuberculosis in a child. *BMJ Case Rep.* 2018 Mar 15;2018 [PMC free article: PMC5878321] [PubMed: 29545432]
  18. Rosendahl K, Bruslerud IS, Oehme N, Júlíusson PB, de Horatio LT, Müller LO, Magni-Manzoni S. Normative ultrasound references for the paediatric wrist; dorsal soft tissues. *RMD Open.* 2018;4(1):e000642. [PMC free article: PMC5856916] [PubMed: 29556421]

Copyright © 2018, StatPearls Publishing LLC.

This book is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, duplication, adaptation, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, a link is provided to the Creative Commons license, and any changes made are indicated.

Bookshelf ID: NBK531497 PMID: 30285392