

What's new in Wrist Surgery?

Owee Mulay¹, Chaitanya Karande Patil², Anup Bansode¹, Satish Mane¹,
Abhijeet L. Wahegaonkar¹

Abstract

Wrist surgery is one of the most evolving fields in orthopaedic surgery. The past 2 years proved to be exciting years in wrist surgery. Thus, this article the authors review and summarize the advances made reported in the literature over the last 2 years. The recommendations for various conditions in wrist surgery have been outlined, which can be helpful for the clinician to make precise evidence based decision for a patient.

Methods: An article search was conducted on the recent research papers and reports published in the past 2 years. The articles of relevance in wrist surgery were chosen for the review.

Results: The overview of the results from different studies provides an elaborate and cohesive background for the practitioner to treat patients.

Conclusion: Taking into account the recent advancements in wrist surgery we can conclude that this study will be of help to the clinicians wanting to practice evidence-based medicine.

Keywords: Wrist surgery, Distal end radius, Arthroscopy, scaphoid, carpal Instability, Scapholunate.

Scaphoid Fractures:

The optimal management of non-displaced scaphoid fractures is yet uncertain. Surgical management maybe advantageous in regards to early resumption of activities in comparison to the conservative management. A systematic review and meta-analysis conducted by Alnaem et al [1] to understand the differences between non-surgical management and percutaneous or mini open fixation of non-displaced or minimally displaced acute scaphoid fractures with regards to time with union, return to work and complication. Around 376 patients were reviewed in ten studies. The results showed that the operative individuals' required shorter time to resume the work (46 compared with 77 days) as

well as the radio-graphic union (44 compared with 79 days) was faster in comparison to the non-operative patients. Conservatively managed patients with a cast immobilizer had lesser complication rate 7% were as the operative group had 14%, however this wasn't significant possibly due to a type-2 error. A similar systematic review and meta-analysis of randomized control trial was conducted comparing the surgical as well the conservative treatment for acute un-displaced or minimally displaced scaphoid fractures. The result of the study conducted by Al-Ajmi et al. [2] couldn't give the superiority of one method compared to the other. Another important implication in scaphoid non-union is impaired vascularity. The treatment of

an avascular proximal scaphoid pole is not necessarily fixing it with a vascularised bone-graft. In a study by Rancy et al [3] conducted on 35 patients with scaphoid non-union were treated with curettage, non-vascularised

bone grafting and headless screw. At the end of 3 months, 33 out of 35 scaphoid were healed which was confirmed using Computed Tomography (CT) analysis. It was concluded that non-vascularised bone-grafting can be efficient as long as the fracture is appropriately stabilized and reduced. A similar study of scaphoid non-union with avascular proximal pole and secondary fragmentation was reconstructed using ipsilateral proximal hamate auto graft. Elhassan et al. [4] and colleagues conducted a study on an 18 year old male symptomatic and who had undergone a previous open reduction and internal fixation elsewhere. Preoperative assessment was done with the help of a CT. ROM was evaluated as 30 degrees on flexion and extension. Operatively proximal pole hamate graft was excised and placed with the use of compression screws. Further care was taken to stabilize the triquetrohamate ligament as well as the carpus secondary stabilizers. Post-operatively thumb spica splint was given for 2 weeks followed by

¹Institute for Orthopedics & Rehabilitation, 16 Shivajinagar, Pune 41105, India.

²Jehangir Hospital, Pune 411001

Address of Correspondence

Dr. Abhijeet L. Wahegaonkar,
Department of Hand Surgery Sancheti Institute for
Orthopaedics & Rehabilitation 16 Shivajinagar Pune 411005
Email: abhiwahe@gmail.com

2 months of cast until union was visible on CT. The patient was evaluated at 3.5 years post reconstruction – the patient's ranges were equal bilaterally 60 degrees of flexion-extension and full forearm rotation. Grip strength of the operative side was 110kg and that of the non-operative side was 120kg. Mayo wrist score was 90 points which is an excellent functional outcome. The Watson shift test for scaphoid and scapholunate ligament was also negative. Overall the study had good outcomes – thus this can be another form of treatment of non-unions, as these types of fractures are difficult to treat when there is secondary fragmentation and avascularity.

Keinböck's disease:

Over the past 2 decades, there have been advancements in the aetiology, classification and the treatment protocols of Keinböck's disease. A recent study by Lichtman et al.[5] established a new treatment algorithm as well as incorporating the traditional osseous classification system. The new treatment algorithm takes the concepts a little further in which it takes under consideration five specific questions: The patient's age, stage of lunate, stage of the wrist, what the surgeon can offer as well as what the patient needs. Depending upon the stage of the lunate, various procedures are available which consist of lunate protection, reconstruction, salvage and the last option of wrist reconstruction. Thus taking this algorithm into account, it can be helpful for the clinician to make precise evidence-based decisions for any patient.

Wrist Arthritis:

A study published by Wagner et al.[6] has compared the long term outcome of proximal row carpectomy (PRC) and 4-corner arthrodesis (4CA) in patients which are younger than the age of 45 years. A retrospective cohort of 89

patients underwent either 4CA or PRC for wrist arthritis. The mean follow up was 11 years in 4CA and 18 years in the PRC group. The study suggests that the complication rate, post-operative pain levels and the wrist function was similar in both the groups. However, the PRC had improved motion compared to 4CA with the mean flexion-extension arc being 73 and 54 degree respectively.

Anaesthesia:

One of the significant advancement in the field of hand surgery is a tourniquet free surgery, with the help of epinephrine which causes haemostasis. This study was published by Don Lalonde.[7] The epinephrine in the finger is safe and causes vasoconstriction which is reversible with phentolamine. The advantage of local anaesthesia is that there is no need for preoperative testing, intravenous insertion, intraoperative monitoring, or the postoperative anaesthetic care unit. This sedation free approach is useful for surgeries including carpal-tunnel syndrome and flexor tendon repair in which the patient is awake and can voluntarily move the joint. Due to this, there has been a decrease in the tenolysis and rupture rate. Hence, the overall monitoring and recovery of the patient is swift.

Scapho-lunate instabilities:

Scapho-lunate dissociation is the most common form of carpal instability. However, there is no gold standard for operative treatment. Thus a prospective observational study conducted by Alexander Kalternborn et al[8] consists of modified minimally invasive extensor carpi radialis longus tenodesis for scapho-lunate dissociation. The study was conducted on a total of 54 patients out of which 46 came for follow up. Pre-operatively Quick-DASH scores were calculated. Operatively the incision of 2 cm was made on the dorsoradial aspect of the wrist, and 1 cm above the radial

styloid. The ECRL is split and fixated 4mm distally to the scaphoid with the help of ASNIS titanium screw. Following the operation the patients underwent hand therapy after 6 weeks. A median follow up was of 24 months – Quick-Dash score was significantly improved post operatively. Also, there wasn't any significant difference between the ROM of flexion-extension between the operated and non-operative wrist. The grip strength was significantly lower on the operative wrist. The study suggests that the procedure is less invasive and has a hope of future salvage options but regardless the post-operative complaint rate was quite high. Wahegaonkar et al[9] described a unique arthroscopic dorsal capsule ligament repair for chronic reducible scapholunate interosseous ligament tears. Their hypothesis is that the dorsal intercarpal ligament is avulsed from the intact dorsal scapholunate interosseous ligament (dSLI). In this technique, a 3.0 PDS suture is placed through a needle as visualized arthroscopically and passed through the dorsal intercarpal ligament (DICL) and the dorsal scapholunate ligament, tied to form a capsuloplasty. No pins are used. In their study series of 36 patients with a 13-month follow-up, results were generally excellent. Patients regained 96% of grip strength compared to the contralateral side and reported that seven of the patients involved in sports were able to return to the same level of activity postoperatively. The advantage of this technique is in the reduction of postoperative stiffness by minimizing the dorsal capsule dissection compared to traditional open surgery.

Distal Radius Fractures:

One of the most common fractures occurs is the distal end radius fracture, there have been different opinion amongst surgeon depending upon the duration of splinting and the effect

splitting has upon outcome of the wrist. Thus, a study by Dennison et al.[10] has compared the outcome of early versus late motion in plating of distal end radius fractures. The study was conducted on prospectively 33 patients, who were randomly assigned into early versus late motion group. The patients in the early motion group were asked to start active and passive wrist motion protocol by 15 days where as the late patient was group was assigned to start the motion by 5 weeks. Pre-operatively fractures were defined intra-articular and extra-articular, also with and without ulnar styloid fracture. The results of the study stated that earlier motion had favoured low DASH, PRWE and pain scores in the first 6 weeks. However, the late motion group had delayed recovery but there was no long term difference in the motion, strength, outcome or pain. But the 2 complications which took place were CPRS and adhesive capsulitis which occurred in the late motion group. Another recent study published by Landgran et al.[11] is a comparison of 2

methods of internal fixation in distal end radius fracture, fragment specific fixation versus volar locking plates in primarily non-reducible or secondarily re-displaced distal radius fracture. The study consisted of 50 patients consisting of the above two conditions, which were then randomized to either open reduction internal fixation using volar locking plates or fragment specific fixation. Post operatively the patients were evaluated on 12 months, there was no difference found in the grip strength, ROM and in the DASH scores of both the group. However, the overall complication rate was significantly high in the fragment-specific group 52% and 21% in the volar plate locking group. Thus it can be concluded that both the methods achieved good clinical outcomes, but the complication rate was significantly higher in fragment-specific group.

Ganglion cyst:

Development of cysts on the volar and dorsal aspect is common, but the results of surgical treatment on cysts have been

published by Kulinski et al.[12] In the study there were a total of 394 patients, who were evaluated after a 2 year long follow up, 69.4% patients were operated for dorsal wrist ganglion and 70.6% patients for excision of volar wrist ganglion. The results of the study suggested limitation of wrist palmar flexion in 6 patients with removal of dorsal wrist ganglion. There was no limitation in the grip strength, however an un-aesthetic scare developed in 15 patient with dorsal ganglion and in 6 patients with volar wrist ganglion removal. Post-operative pain was observed in 7 patients with ganglion recurrence and in 17 patients without recurrence. Recurrence of cyst was 12.1% in dorsal wrist ganglion and 10.4% in patients operated for volar cysts. However, there was no influence of patient's gender, age, or cyst location on ganglion recurrence was detected. [11] Thus it can be concluded that surgical ganglion cyst removal is a very recognized and helpful method, where in there are low complication rates.

References

- Alnaeem H, Aldekhayel S, Kanevsky J, Neel OF. A Systematic Review and Meta-Analysis Examining the Differences Between Nonsurgical Management and Percutaneous Fixation of Minimally and Nondisplaced Scaphoid Fractures. *J Hand Surg Am.* 2016 Dec;41(12):1135-1144.e1
- Al-Ajmi TA, Al-Faryan KH, Al-Kanaan NF, Al-Khodair AA, Al-Faryan TH, Al-Oraini MI, Bassas AF. A Systematic Review and Meta-analysis of Randomized Controlled Trials Comparing Surgical versus Conservative Treatments for Acute Undisplaced or Minimally-Displaced Scaphoid Fractures. *Clin Orthop Surg.* 2018 Mar;10
- Rancy SK, Zelken JA, Lipman JD, Wolfe SW. Scaphoid Proximal Pole Fracture Following Headless Screw Fixation. *J Wrist Surg.* 2016 Mar;5(1):71-6.
- Elhassan B, Noureldin M, Kakar S. Proximal Scaphoid Pole Reconstruction Utilizing Ipsilateral Proximal Hamate Autograft. *Hand (N Y).* 2016 Dec;11(4):495-499.
- Lichtman DM, Pientka WF 2nd, Bain GI. Kienböck Disease: A New Algorithm for the 21st Century. *J Wrist Surg.* 2017 Feb;6(1):2-10.
- Wagner ER, Werthel JD, Elhassan BT, Moran SL. Proximal Row Carpectomy and 4-Corner Arthrodesis in Patients Younger Than Age 45 Years. *J Hand Surg Am.* 2017 Jun;42(6):428-435.
- Lalonde D. Minimally invasive anesthesia in wide awake hand surgery. *Hand Clin.* 2014 Feb;30(1):1-6.
- Kaltenborn A, Hoffmann S, Settje A, Vogt PM, Gutcke A, Rüttermann M. Modified minimally invasive extensor carpi radialis longus tenodesis for scapholunate dissociation: a prospective observational study. *BMC MusculoskeletDisord.* 2017 Jan 31;18(1):54.
- Wahegaonkar AL, Mathoulin CL: Arthroscopic dorsal capsule ligamentous repair in the treatment of chronic scapho-lunate ligament tears. *J Wrist Surg*2:141–148, 2013
- Dennison DG, Blanchard CL, Elhassan B, Moran SL, Shin AY. Early Versus Late Motion Following Volar Plating of Distal Radius Fractures. *Hand (N Y).* 2018 Jul 1:1558944718787880
- Landgren M, Abramo A, Geijer M, Kopylov P, Tägil M. Fragment-Specific Fixation Versus Volar Locking Plates in Primarily Nonreducible or Secondarily Redisplaced Distal Radius Fractures: A Randomized Controlled Study. *J Hand Surg Am.* 2017 Mar;42(3):156-165.e1.
- Kuliński S, Gutkowska O, Mizia S, Martynkiewicz J, Gosk J. Dorsal and volar wrist ganglions: The results of surgical treatment. *Adv Clin Exp Med.* 2018 Aug 2.

Conflict of Interest: NIL
Source of Support: NIL

How to Cite this Article

Mulay O, Patil C K, Bansode A, Mane S, Wahegaonkar A L. What's new in Wrist Surgery?. *Journal of Clinical Orthopaedics* Jan-June 2018; 3(1):29-31