*Acta Orthop. Belg.*, 2011, **77**, 290-293



# The volar portal in wrist arthroscopy

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**Wrist arthroscopy is not only a diagnostic tool; it has also developed into a valuable treatment alternative for several wrist disorders. All of the standard portals are dorsally located, leaving the dorsal sector of the radiocarpal and midcarpal joint partially invisible. A volar portal has been developed through the bed of the flexor carpi radialis tendon, thus expanding the therapeutic possibilities. We report our personal experience with the use of a volar portal in 28 of 206 (14%) wrist arthroscopies. No technical problems or neurovascular complications were encountered. We think the standardized approach as described is valuable and safe.**

**Keywords** : wrist arthroscopy ; volar approach.

## INTRODUCTION

Arthroscopy of the wrist was developed in the eighties when proper instruments were made available and the portals, the surface anatomy and intra-articular anatomy were described (*3,9*). During the last decade this technique became an established approach for the diagnosis and (surgical) treatment of several wrist disorders. Wrist arthroscopy allows us to see the cartilage of the radiocarpal, midcarpal and even distal radioulnar joint, the triangular fibrocartilage complex (TFCC), the synovium and capsular ligaments. All classical portals are dorsal. When using these portals an important sector of the radiocarpal joint remains partially hidden and it is in most wrists difficult or even impossible to perform surgical procedures on the dorsal side of the wrist through the classical portals.

Based on anatomical studies, Abe *et al* (*1,2*), Slutsky (*10,11,14*) and Tham *et al* (*15*), developed a volar portal through the bed of the flexor carpi radialis sheath.

## MATERIAL AND METHODS

From July 2008 to October 2010 we performed 206 wrist arthroscopies ; a volar portal was used in 28 of them (14%). The mean age of our patients at the time of the operation was 29.7 years (range : 11-50), with a male/female ratio of 5/23. The postoperative regime depends on the procedure performed.

### Volar portal technique

The patient is placed supine with the traditional traction system applied. General anaesthesia is preferred since good muscle relaxation is required. Draping is not

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*No benefits or funds were received in support of this study*

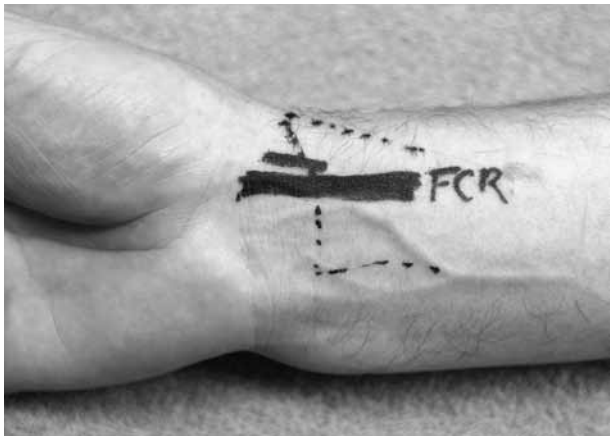


***Fig. 1.*** — The volar portal

always easy and some creativity is mandatory: positioning must allow access to the dorsal and palmar aspect of the wrist (Fig. 1). We prefer to have the surgeon, the assistant and the nurse on the same side, with the instruments table behind them; the video equipment is on the opposite side of the patient.

The joint is first explored through the classical dorsal portals. A 1 cm incision is then made over the flexor carpi radialis (FCR), the soft tissues are distended with a haemostat, the FCR is retracted ulnarly and finally the joint capsule is perforated through the bed of the FCR with a blunt trochar. When it is not easy to find the radiocarpal joint it is possible to introduce a blunt obturator in the 3,4 dorsal portal (between extensor pollicis longus and extensor digitorum communis tendon) and to advance it towards the anterior capsule. The tip can now easily be palpated in the new developed palmar portal. The joint is flushed with saline and the 2.7 mm scope is introduced through the volar portal. The 3,4 portal and the 6R portal (radial to the extensor carpi ulnaris) are used for probing the surface of the cartilage, the scapholunate and the dorsal radiocarpal ligament. The 6U portal (ulnar to the extensor carpi ulnaris) is used as an outflow portal. The radial insertion of the triangular fibrocartilage complex (TFCC) is the ulnar limit of this portal. Under control of the scope in the volar portal and with the shaver introduced through the 3,4 portal, different surgical procedures can be realized such as radial styloidectomy, dorsal synovectomy and dorsal ganglion resection.

At the end of the operative procedure the joint is flushed with saline and a compressive dressing is applied. The portals do not need to be closed.

## RESULTS

In 25 patients a dorsal synovectomy was performed, combined with a dorsal ganglion resection in 15, a capsular calcification in 1 and a simultaneous radial styloidectomy in 1. The 3 remaining patients had a volar portal only for diagnostic reasons. Through the volar portal, an otherwise hidden sector of the wrist becomes visible. The dorsal capsule could easily be visualised in all patients.

No technical problems were encountered and there were no neurovascular complications.

After surgery a compressive bandage was applied in all patients. Further regimen depended on the intraoperative findings. All patients were seen for wound control 10 days after surgery. We encountered no wound problems. All patients were allowed to start immediate mobilization exercices. We saw no early recurrence of symptoms, but we only have a short-term follow-up of our patients.

In figure 2A, the typical dorsal synovitis can be seen before synovectomy, in 2B the resected capsule with visualization of the overlying extensor tendons is obvious.

## DISCUSSION

The anatomy of the wrist capsule is very constant. The anterior ligaments have a constant pattern. The radioscaphocapitate ligament (RSC) is the most lateral, extending from the radial styloid towards the scaphoid and capitate, the long radiolunate ligament (LRL) or radiolunatetriquetral ligament is slightly more medial from the anterior rim of the radius towards the lunate. The next structure is the radioscapholunate ligament which is not a real ligament but rather a meso containing a blood vessel. The short radiolunate ligament is running from the most ulnar side of the radius to the lunate.

Levy and Glickel (*7*) used a volar approach between the LRL and radioscapholunate ligament (RSL) in palmar plating of wrist fractures through the standard carpal tunnel incision to inspect the radiocarpal joint after fixation of the plate. Jantea *et al* (*6*) found their radiocarpal portal lateral to the RSC ligament too close to the radial artery. Osterman *et al* (*8*) used an inside-out volar approach

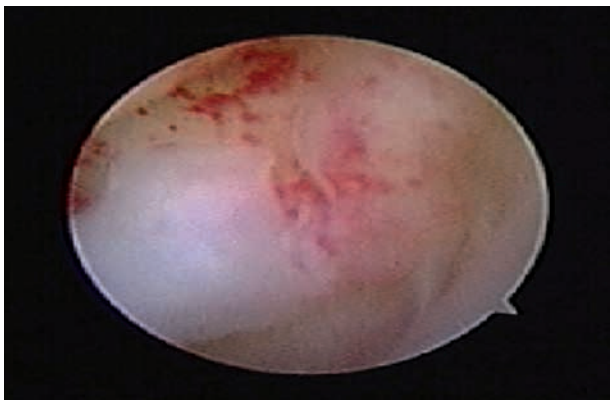

***Fig. 2A.*** — Synovial hypertrophy of the dorsal capsule, at the base of a dorsal ganglion.

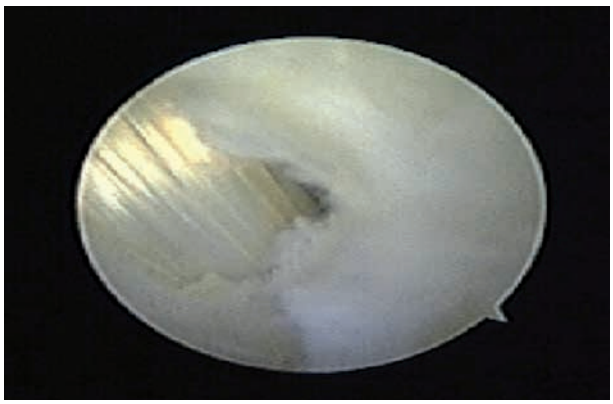

***Fig. 2B.*** — Synovial hypertrophy of the dorsal capsule after resection of the stalk ; note the capsular opening with visualisation of the overlying extensor tendons.

between the RSL and LRL ligament for dorsal capsular releases. Tham *et al* (*15*) used an inside-out switching technique. Through the 3,4 portal a rod was pushed forward between the RSL and the LRL ligament. The safety was first tested on cadavers and they reported on 14 cases. Slutsky *et al* (*14*) reported their experience with the above described technique. They also first conducted an anatomical study on cadavers and had experience with 30 cases. Doi *et al* (*4*) in a series of 34 cases of intra-articular fractures had used the portal as described later by Slutskey *et al* (*14*). The incidence of dorsal ligament injuries was not negligible in patients with chronic wrist pain : 35 of the 64 cases, mostly in combination with other intra-articular ligament lesions (*12*). Henry (*5*) described dorsal capsule impingement as a cause for dorsal wrist pain. These lesions can only be seen with a volar portal (*9*). The volar portal as described above is safe and Abe *et al* (*1*) have recently published their experience with more than 250 cases without complications. A safe ulnar approach has been recently described (*13*).

Slutsky recorded intraoperative pathology noted through the volar portal that was not seen earlier through the classical dorsal portals in a chart review of 30 patients. Additional pathology of the palmar scapholunate interosseous ligament and dorsal capsular structures was identified in 30% of the patients (*14*).

We believe that using an additional volar portal not only gave us a better diagnosis but also made it much easier to treat dorsal capsular problems such as synovitis and ganglions under visual control with the scope through this portal. The advantages of using arthroscopy in comparison to open procedures are obvious : the scars are unnoticeable, and mobility is regained easily.

In conclusion, we found that using the volar portal in wrist arthroscopy expands the therapeutic options and is a valuable and safe alternative, especially for dorsal capsular problems. We do not have a long-term follow-up of our patients, but to our knowledge, no prospective randomized studies have been able to show a difference in recurrence rate between open and arthroscopic treatment of dorsal capsular pathology.

## REFERENCES

1. **Abe Y, Doi K, Hattori Y, Ikeda K, Dhawan V.** A benefit of the volar approach for wrist arthroscopy. *Arthroscopy* 2003 ; 19 : 440-445.
2. **Abe Y, Doi K, Hattori Y, Ikeda K, Dhawan V.** Arthroscopic assessment of the volar region of the scapholunate interosseous ligament through the volar portal. *J Hand Surg* 2003 ; 28A : 69-73.
3. **Berger RA.** Arthroscopic anatomy of the wrist and distal radioulnar joint. *Hand Clin* 1999 ; 15 : 393-413.
4. **Doi K, Hattori Y, Otsuka K, Abe Y, Yamamoto H.** Intra-articular fracture of the distal aspect of the radius :

arthroscopically assisted reduction compared with open reduction and internal fixation. *J Bone Joint Surg* 1999 ; 81-A : 1093-1110.

5. **Henry M.** Arthroscopic management of dorsal wrist impingement. *J Hand Surg* 2008 ; 33-A : 1201-1204.
6. **Jantea CL, Baltzer A. Rüther W.** Arthroscopic repair of radial-sided lesions of the triangular fibrocartilage complex. *Hand Clin* 1995 ; 11 : 31-36.
7. **Levy HJ, Glickel SZ.** Arthroscopic assisted internal fixation of volar intra articular wrist fractures. *Arthroscopy* 1993 ; 9 : 122-124.
8. **Osterman AL, Bednar OM.** The arthroscopic release of wrist contracture. Presented at the 55th Annal Meeting of the American Society for Surgery of the Hand, Seattle WA, 2000.
9. **Palmer AK, Phoeling GG, Viegas SF, Whipple TL.** Wrist arthroscopy. *Contemp Orthop* 1991 ; 22 : 565-601.
10. **Slutsky D, Nagle D.** Wrist arthroscopy : Current concepts. *J Hand Surg* 2008 ; 33-A : 1228-1244.
11. **Slutsky DJ.** Arthroscopic repair of dorsal radiocarpal ligament tears. *Arthroscopy* 2002 ; 18 : E49.
12. **Slutsky DJ.** The incidence of dorsal radiocarpal ligament tears in patients having diagnostic wrist arthroscopy for wrist pain. *J Hand Surg* 2008 ; 33-A : 332-334.
13. **Slutsky DJ.** The use of a volar ulnar portal in wrist arthroscopy. *Arthroscopy* 2004 ; 20 : 158-163.
14. **Slutsky DJ.** Wrist arthroscopy through a volar radial portal. *Arthroscopy* 2002 ; 18 : 624-630.
15. **Tham S, Coleman S, Gilpin D.** An anterior portal for wrist arthroscopy. Anatomical study and case reports. *J Hand Surg* 1999 ; 24-B : 445-447.