

Arthroscopic surgery of the wrist

By Deanne Fitzpatrick, R.N.

Wrist arthroscopy is a recent development in the field of orthopaedics. Clinical use of the arthroscope in North America began in the 1970's and revolutionized the management of knee problems. Patients undergoing arthroscopic knee surgery tend to rehabilitate more quickly and experience less pain post-operatively than patients undergoing invasive surgery. Infections following arthroscopy are rare, and in most cases, arthroscopic procedures are performed on an outpatient basis.¹

Smaller joints

Following the success that knee surgeons have had with the arthroscope, orthopaedists have become proficient at performing arthroscopy on smaller joints, including the shoulder and ankle.

At Victoria Hospital in London, Ontario, Dr. James H. Roth, for the past seven years, has been developing a technique of wrist arthroscopy in hopes of improving the diagnosis and treatment of internal

derangement of the wrist.² (Figure 2, next page). The purpose of this paper is to describe a technique of wrist arthroscopy and to outline the instrumentation we are presently using.

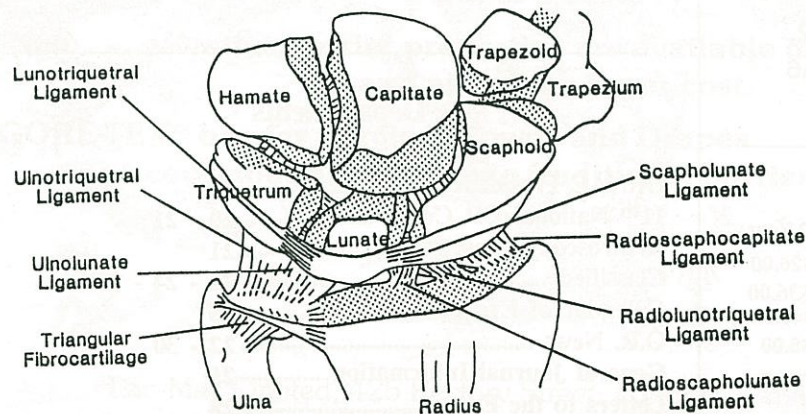
Anatomy

The bones of the wrist are called carpals and are situated in two rows of four each. In the proximal row from medial to lateral are the pisiform (not seen on the dorsal view), triquetrum, lunate and scaphoid. In the distal row from medial to lateral are the hamate, capitate, trapezoid and trapezium which articulate with the five metacarpal bones of the palm of the hand. The styloid process of the radius is larger than the styloid process of the ulna and articulates with the carpal bones of the wrist. (Figure 1, below)

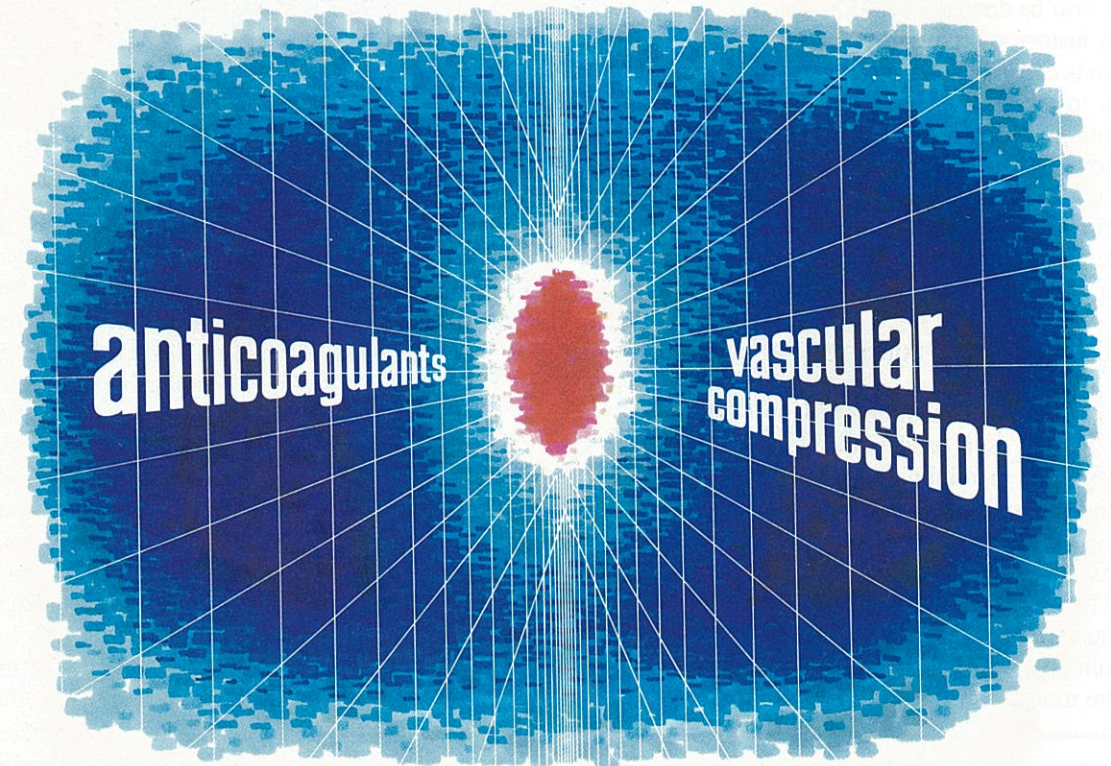
The wrist joint is a complex synovial joint composed of fifteen bones and twenty-seven articular surfaces. This anatomic complexity provides numerous opportunities for the development of joint symptoms.³ Included are synovitis, degenerative arthritis, loose bodies, carpal instabilities, intra-articular fractures, non-union of fractures, distal radioulnar joint disruptions, and triangular fibrocartilage tears.

Pre-op routine

Wrist arthroscopy is performed in the operating room with the patient under general anaesthesia, axillary or intravenous regional block. Most



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procedures are performed on an outpatient basis.

The patient arrives in the admitting department two hours prior to surgery. If x-rays are necessary, the patient will go directly to that department and then proceed to the Day Surgery unit. On arrival the patient will change into a hospital gown before filling out the necessary consent forms and questionnaires. Routine lab tests will also be done at this time.

A history and physical examination is carried out prior to admission to the O.R. theatre. The circulating nurse will review the chart and verify with the patient the correct limb. This must be accomplished before entering the O.R. in order to ensure that all equipment is located on the appropriate side. (Figure 3)

Intra-operative routine

The use of the Arthrobot™ Upper Limb Positioning System as a hand holder for wrist arthroscopy has helped to minimize the amount of time spent securing a safe position for the patient's arm and also allows the surgeon to reposition the limb as necessary and still maintain a sterile field.

The Arthrobot is attached to the O.R. bed on the opposite side to the surgical site. This aids positioning of the sterile set-up and permits the surgeon more room on the operative side.

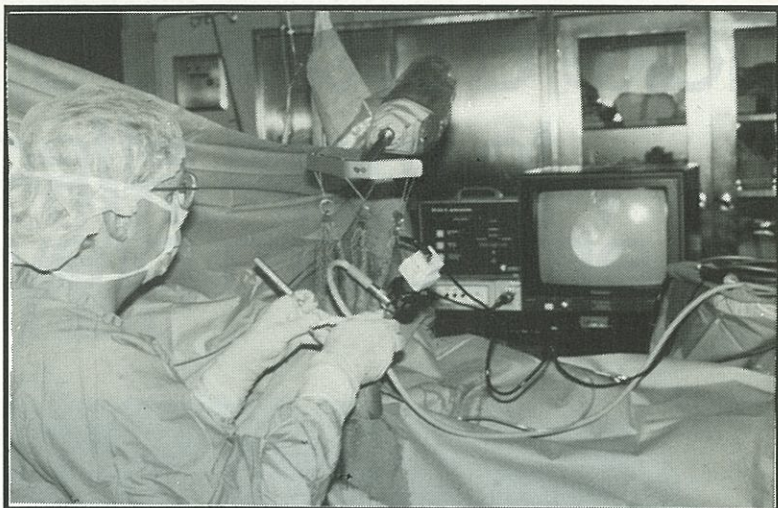


Figure 2 - Wrist arthroscopy being performed

The patient is supine with his torso close to the operative side to allow for shoulder abduction and for the arm to hang free from the table. The Arthrobot slides onto the side rail of the O.R. bed.

We also have a similar piece of side rail and metal straps attached to a wall in the corner where the Arthrobot stands elevated from the floor when not in use. For ease of handling we suggest hooking it up to a nitrogen line set at 90 lbs. PSI and to the electrical plug while it is still on the wall. The nitrogen causes the system to become rigid while the electrical connection enables the articulation and movement of the Arthrobot arm by pressure pads being touched. (Figure 5, page 9)

While the patient is awake the Arthrobot arm is left in the straight-up position, attached to the O.R.

bed. The finger trap accessory with assorted small, medium and large finger grips has been flash autoclaved and once cooled will be placed in an arthroscopy camera drape. The patient's non-operative arm will rest on an arm-board just below the Arthrobot where the anaesthetist will start an intravenous of 5% Dextrose and 0.2% NaCl. Vital signs

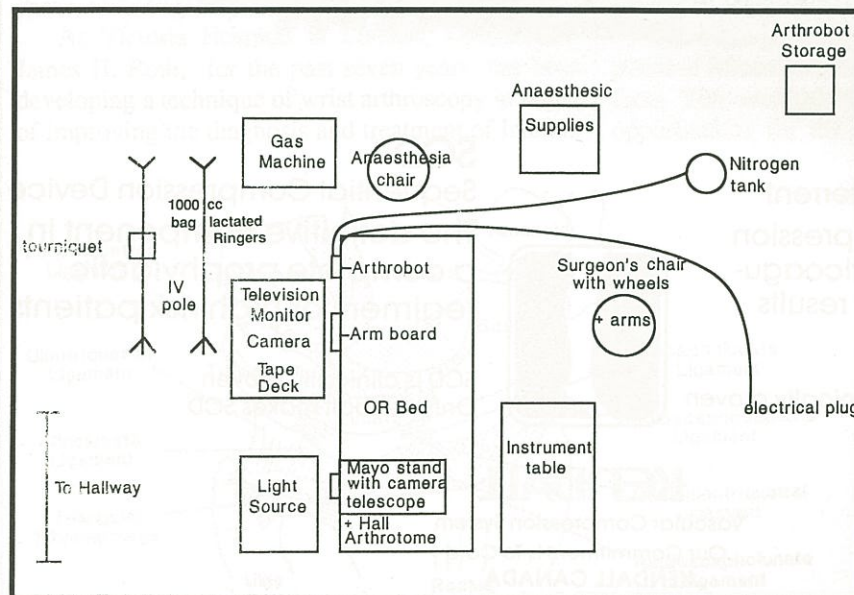


Figure 3
Operating Room
Set-up for
Left Wrist Arthroscopy



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and EKG will be monitored for the duration of the surgery. The anaesthetic drugs will be administered, and once the patient is asleep the circulating nurse will bring the Arthrobot across the patient and hold the quick couple adaptor open for the surgeon or scrub nurse to attach the finger traps. The circulating nurse then pulls the outside edge of the arthroscopy drape and covers the Arthrobot to ensure sterility when the device is activated by the surgeon. A tourniquet has been applied to the patient's upper arm and a canvas sling placed over the top. The hand and arm are prepped with a tincture of Iodine solution. It is important to use non soap-based solutions so the fingers will not slip from the traps.

Two or three fingers are placed in the traps, either radial or ulnar, depending on the pre-operative diagnosis. While still holding the hand with a sterile towel for extra support, the surgeon positions the Arthrobot with fingers attached in a comfortable working position exposing the dorsum of the hand.

Draping

The patient is then covered with an adherent split sheet. The surgeon will sit on a special replant chair with adjustable arm rests and wheels. Mayo covers are draped over the arms with a sheet over the back and seat. Seven pounds of weight are attached to the ring at the lower end of the canvas sling by the circulator to provide extension of the wrist joint.

The scrub nurse will hand off the ends of the fiberoptic light cord, arthrotome cord, suction tubing and sterile I.V. tubing, which will be attached to a 1000cc bag of lactated ringers.

Technique and instrumentation

All the video equipment, including the T.V. monitor, camera, light source, tape deck and the power source for the arthrotome shaver, is positioned on the opposite side of the O.R. bed for ease of visualization by the surgeon and to maintain a sterile field on the operative side.



Figure 4. Instruments for arthroscopic wrist surgery

- | | | | | |
|---|---|--|-----------------------------|--|
| Suction tubing
towels, Mayo covers
X 2, Sheets X 2
Adherent split sheet
sterile I.V. tubing | Prep dish
scissors
local syringe | Lactated Ringers
20cc syringe
#18 hypodermic | Kelly's
T clips | Finger trap
in arthroscopy
drape |
| | 5mm telescope
with sheath
and obturator | 2mm telescope
with sheath
and obturator | | |
| | | Straight
and angled
currettes | Obturator &
3mm sheath | |
| Punches: right angles,
left angled and straight | Pituitary
rongeur | Wrist hook
& crochet hook | #15 blade &
knife handle | |

Techniques and instrumentation of wrist arthroscopy have been modified from those used in knee arthroscopy. Instruments continue to evolve as new procedures are conceived. (Figure 4)

To obtain a view of the wrist we use a combination of distension and distraction with an angled arthroscope. The arthroscope gives a magnified view. An angled probe is used to determine the size of the pathology seen and to aid orientation of what is seen on the monitor.

Two portal sites are chosen, one for visualization and one for operating. An 18 gauge needle attached to a 20cc syringe is inserted into the radiocarpal joint which is distended with lactated ringers. The needle is removed and a longitudinal stab incision is made with a No. 15 blade through the skin and dorsal capsule. The blunt-tipped trochar and arthroscope sheath are introduced through the portal. The trochar is removed and the 3mm diameter, 30° angle arthroscope with chip camera attached is inserted. The I.V.

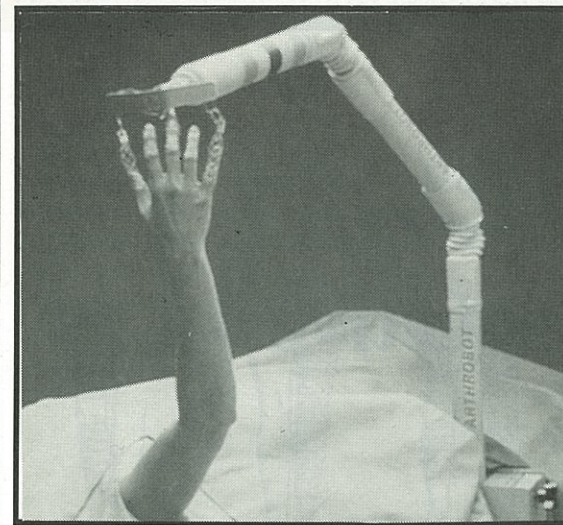


Figure 5. The arthrobot with the Roth finger trap accessory showing finger grips

tubing is connected to the telescope to provide continuous distension of the joint.

After probing to assess the arthroscopic findings, it may be necessary to do a synovial biopsy with pituitary rongeurs, or a piece meal excision of a triangular fibrocartilage tear with the small but sturdy graspers and punches. The high speed arthrotome with hand control is attached to suction and can be used for debridement and irrigation of the joint space. It is also possible to reduce intra-articular fractures using a hook similar to a crochet hook and to remove any fragments. These could be reduced or immobilized by percutaneously inserting a small pin. It will be checked under direct visualization and also occasionally with the aid of fluoroscopy and intra-operative x-rays.

At the end of the procedure the joint is injected with 10cc of 0.5% bupivacaine hydrochloride to diminish post-operative discomfort. A bulky hand dressing incorporating volar and dorsal plaster splints is applied and the tourniquet released.

Summary/conclusion

The patient will be transferred to the recovery room for approximately forty-five minutes where vital signs and fingers are checked. The arm will be kept elevated with the patient being instructed to do the same on return to Day Surgery as well as when at home.

If there is a change or loss of sensation, swelling, coldness or blueness, it is imperative that the physician be notified. The patient will also be instructed to return to the clinic to have the dressing removed. The findings at surgery will be reviewed with the patient at that time and any necessary follow-up treatment discussed.

In summary, a technique of wrist arthroscopy has been described, with the instrumentation that we are presently using also being described. ■

References

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4. Zimmer Product Information; Arthrobot Upper Limb Positioner, Zimmer Arthroscopic Systems, 197-4042-01.

Acknowledgement

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About the author

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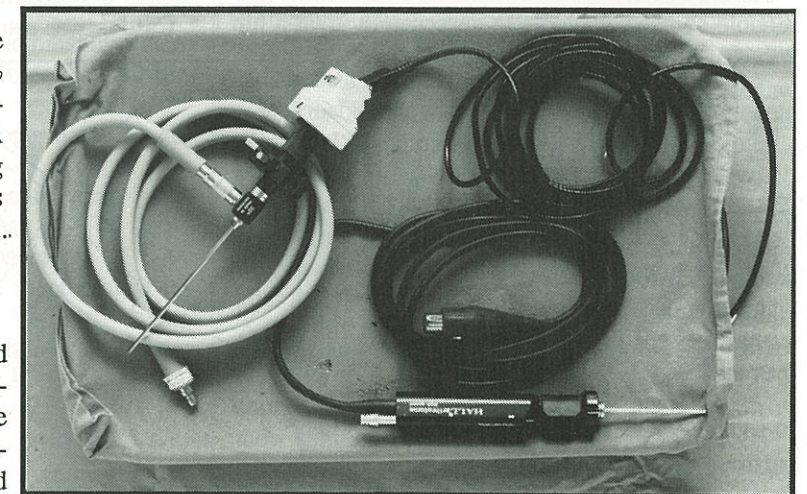


Figure 6, Mayo tray with a 3mm telescope, a chip camera and the Hall arthrotome