

# ARTHROSCOPIC LUNATE EXCISION IN A HIGH DEMAND INDIVIDUAL



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## Abstract:

The surgical technique with short-term clinical and radiological outcomes after arthroscopic lunate excision in a high-demand patient are summarised in this case report. We hypothesise that this minimally invasive procedure preserves the dorsal intercarpal and dorsal radiocarpal ligaments and also preserves the movements occurring in the radiocarpal and mid-carpal joints thereby improving the clinical results. Our short-term outcomes show excellent improvement in DASH score at 3 months post-operatively

## Introduction:

Avascular necrosis of lunate is seen increasingly after the covid pandemic. Treatment options include open dorsal lunate excision with or without limited wrist arthrodesis and proximal row carpectomy for Lichtman stage III. Recently, arthroscopic lunate excision is being established as another modality of management for low demand patients. We are reporting our surgical technique, short-term clinical and radiological outcomes following arthroscopic lunate excision in a high demand individual.

## Case Report:

The patient is a 47 year old factory worker with right wrist pain for 20 months. He gives a history of trivial injury to the right wrist. He was initially treated with below elbow cast for a period of 6 weeks after the trivial injury. He continued to have pain which was progressive. On examination he had tenderness over the lunate and a limited range of motion of 15° dorsiflexion and 25° of palmarflexion. Plain x-rays and MRI of the wrist showed collapse of lunate with edema in capitate and minimal scaphoid rotation which confirmed the diagnosis of avascular necrosis of lunate or Kienbock's disease Lichtman stage III A/B(Fig 1).



Fig 1: Pre-operative Radiographs & MRI. A: AP radiograph, B, C, D: MRI showing collapse of lunate with edema in capitate

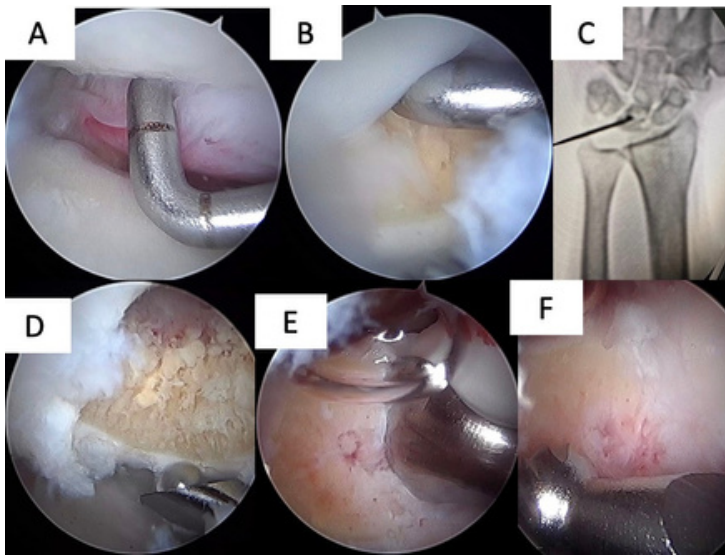


Fig 2: Intraoperative images. A: Probing through the membranous portion of scapholunate junction, B. Probe through the SL junction is able to fracture and enter the weak lunate, C.C-arm image identifying the lunate which is fractured by the probe, D: Burr removing the articular surface of lunate and the bone from scaphoid side towards the lunate, E: Elevators are used to dissect the remnant flake of bone at the LT junction. F: Burr used to remove remnant of bone from the SL junction

## Surgical Technique:

The procedure is performed under regional block with patient in supine position. The upper limb is painted and draped. The wrist is distracted on a traction system with a sterile hand holder. Through standard 3-4 and 6R portals diagnostic arthroscopy is performed. After a diagnostic round, viewing from 3-4 portal, the membranous portion of scapholunate junction is probed from the 6R portal. The fragile bone of the lunate can be fractured using the probe and absence of marrow bleeding from the fractured site can be noted. This maneuver confirms that the lunate is avascular. A c-arm image can be taken to confirm the lunate before starting excision. Using a 2.9mm burr the cartilage and avascular bone of lunate is resected from the scaphoid side towards the triquetral side. After gross excision, the remnants at the scapholunate junction and the lunotriquetral junction are gently mobilised using an elevator and removed using a combination of grasper, shaver and burr (Fig 2). Now the mid carpal ulnar portal is made and the arthroscope is shifted to the mid carpal ulnar portal. The mid carpal radial portal is next made by the outside in technique. Using the shaver and burr the remnants of bone from the distal part of lunate is removed. The proximal articulating surface of capitate is seen well now after complete excision of lunate small bleeding surfaces in the volar capsule are coagulated using the radiofrequency device (Fig 3).

The empty space after lunate excision and adjacent scaphoid and lunate are visualised from midcarpal and radiocarpal portals. Joint lavage is done. Portal closure is done as per surgeon's choice.

## Discussion:

There is limited literature on the outcomes of arthroscopic lunate excision. Reports from Blanco et al in 1985 of open lunate excision through dorsal approach for avascular necrosis of lunate stage III showed satisfactory clinical results<sup>1</sup>. Literature showed only occasional case reports of open lunate excisions until recently Shimizu et al in 2021, published a series of 15 low-demand patients with excellent post-operative pain relief and functional outcomes at 2-year follow-up following arthroscopic lunate excision<sup>2,3,4</sup>. Based on the results by Shimizu et al, we performed arthroscopic lunate excision in a 47-year-old high demand factory worker.

In our case report short term patient related outcome evaluation showed excellent outcomes. DASH score significantly improved to 11.7 at 3 months post-op from 39.2 pre-op. The other treatment options for this condition are lunate excision and limited wrist fusion and proximal row carpectomy. These procedures give good pain relief but the mid carpal and radiocarpal movements are disturbed with these procedures.

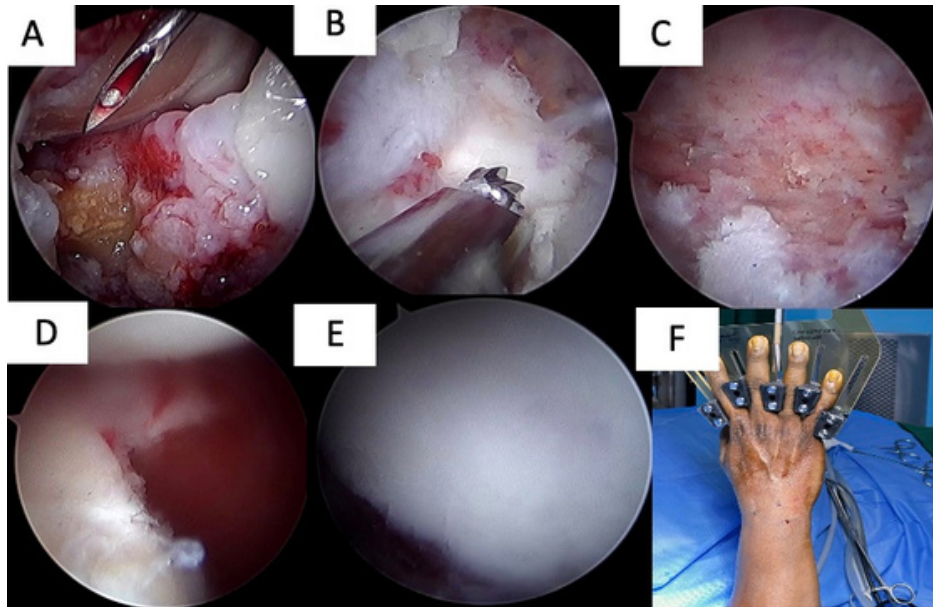


Fig 3: Intraoperative images. A: Mid carpal ulnar portal made by the outside in technique, B. Viewing through the mid carpal ulnar portal remnants of bone is removed from the mid carpal radial portal, C: Volar capsule intact after the excision of lunate, D: Empty area after lunate excision viewed from mid carpal portal, E: The intact triquetrum surface adjacent to empty space after lunate excision, F: Arthroscopic portals at the end of the procedure

With arthroscopic lunate excision, we have the advantage of preserving these articulations and movements.

Open dorsal approach lunate excision disrupts the dorsal intercarpal and dorsal radiocarpal ligaments which destabilises the wrist. Stress on the scaphoid and proximal migration of capitate are unavoidable in any form of lunate excision, but since the dorsal and volar stabilisers of the wrist are left intact with arthroscopic lunate excision we hypothesise that the rate of these events might be slower and will have a lesser impact on clinical outcomes. This is evident in our case report since patient has good clinical outcomes although radiological changes are seen post-operatively (Fig 4).

The advantages of performing lunate excision through arthroscopy rather than open dorsal approach suggests that arthroscopic lunate excision maybe a good procedure in high demand patients also.

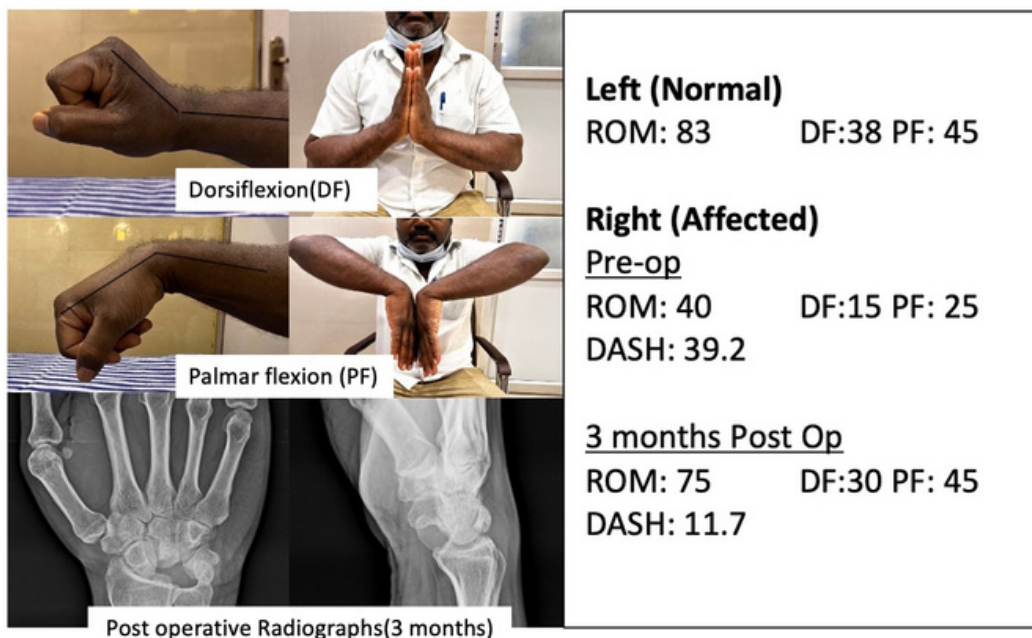


Fig 4: Post-operative clinical and radiological follow-up

## Conclusion:

Arthroscopic Lunate excision may be a good procedure for avascular necrosis of lunate Stage IIIA/B.

Short-term results are satisfactory in this high-demand patient. Long-term follow-up and a series of cases are required for better evidence.

## References:

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