International Journal of Research and Review
[Indexed, Peer-Reviewed Journal]
Volume 13; Issue: 7; July 2026
Website: www.ijrrjournal.com
Case Report *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Beyond Fixation: Structural Scaphoid Reconstruction for Preiser's Disease with Humpback Collapse: A Case Report

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DOI: https://doi.org/10.52403/ijrr.20260738

ABSTRACT

Preiser's disease, or idiopathic avascular necrosis of the scaphoid, is a rare condition that may cause progressive collapse, humpback deformity, carpal instability, and loss of wrist function in young adults, where joint-preserving reconstruction is increasingly emphasized. We report a 29-year-old man with chronic atraumatic left wrist pain for one year; imaging demonstrated idiopathic scaphoid avascular necrosis with humpback deformity and structural collapse, and preoperative VAS pain was 5 with grip strength 10.5 kg. He underwent volar open reduction with corrective osteotomy, reconstruction using a 1-cm structural corticocancellous iliac crest autograft to restore scaphoid height and alignment, and fixation with a 2.4-mm headless compression screw. At 3-month follow-up, pain decreased from VAS 5 to 1, grip strength improved from 10.5 kg to 30 kg, and the patient returned to work. Wrist motion improved in flexion, extension, pronation, and supination, and radiographs showed maintained deformity correction and restored carpal alignment. Structural iliac crest autograft provides biological and mechanical support, while headless compression screw fixation enables stable compression. This technique represents a promising joint-preserving reconstructive option for selected young patients with scaphoid collapse and carpal instability.

Keywords: Preiser's disease; scaphoid avascular necrosis; humpback deformity; iliac crest autograft; headless compression screw; wrist reconstruction

INTRODUCTION

The scaphoid is a carpal bone on the radial side of the wrist that plays a major role in maintaining stability and load transfer between the proximal and distal carpal rows. Its unique position, bridging both carpal rows, means that any disruption to its continuity, alignment, or internal vascularity can have disproportionate consequences for overall wrist function. Disturbances in continuity, alignment, or vascularity of the scaphoid can cause persistent pain, restricted motion, reduced grip strength, and a risk of degenerative carpal changes. In patients of productive age, the functional implications are important because the hand is used for work, lifting loads, driving, and activities requiring weight bearing. [1–4]

The scaphoid has a relatively vulnerable vascular pattern, particularly in the proximal portion, so nonunion, malunion, and AVN are clinically important. The majority of the scaphoid's blood supply enters distally through the dorsal ridge and travels proximally in a retrograde direction, leaving

the proximal pole dependent on this single vascular territory. Consequently, any injury or unrecognized fracture that interrupts this flow places the proximal fragment at high risk for ischemia, progressive bone resorption, and eventual collapse, which may manifest weeks to months after the initial insult. For persistent radial wrist pain, targeted physical examination should be combined with scaphoid-view X-ray, MRI to evaluate bone viability, and CT when needed to assess union, deformity, or bone defects. [1,3,4]

This case report is prepared in the format of a Universitas Indonesia educational report and a case report article aligned with CARE principles. The CARE guidelines encourage complete, transparent case reporting that covers diagnosis, intervention, outcome, patient perspective, and informed consent. Presenting this case is relevant because the management of suspected scaphoid AVN or malunion requires integration of clinical, radiological, and intraoperative findings to justify surgical decision-making, which in this patient involved open reduction and internal fixation with a headless compression screw combined with autologous iliac bone grafting. Documentation of such cases contributes to the understanding of surgical indications, technique nuances, and rehabilitation considerations in a resource-sensitive clinical context. [5,6]

CASE PRESENTATION

Patient Information and History

Mr. A, a 29-year-old right-hand-dominant male employed as a private worker, presented with pain in the left palm and wrist that had been ongoing for approximately one year before this visit. The pain was predominantly provoked by lifting loads and by weight bearing on the left hand. The patient denied any history of clear trauma, systemic disease, prior surgery, drug allergy, family disease, or routine medication use. Sensitive administrative data, including full name, medical record number, contact information, and ward details, are not disclosed in this manuscript in accordance with patient confidentiality requirements, given that the case documentation includes clinical and intraoperative photographs.

Physical Examination

Objective examination of the left hand and wrist region revealed no swelling, bruising, or visible deformity. Palpation elicited tenderness localized to the scaphoid region. Distal neurovascular status was intact, as evidenced by capillary refill time under two seconds, a palpable radial artery, peripheral oxygen saturation of 98%, and normal distal sensation. Active wrist range of motion was recorded at 40 degrees flexion and 60 degrees extension, while metacarpophalangeal and interphalangeal joint motion was 0 to 90 degrees. These findings supported a local pain source at the scaphoid with relatively preserved finger function and no evidence of distal perfusion or sensory compromise.

Ancillary Investigations and Diagnostic Assessment

The working diagnosis established in this case was suspected avascular necrosis and malunion of the left scaphoid. This was based on the chronicity of radial wrist pain, localized scaphoid tenderness, pain provocation under axial loading, the available imaging, and intraoperative findings. Because an official radiology report was not available in the source data, AVN was not stated as a definitive radiological diagnosis.

A scaphoid-view plain radiograph was obtained to evaluate scaphoid contour, carpal alignment, and suspected nonunion or malunion, as well as to assess postoperative implant position and any signs of degenerative change. The available radiograph served as visual documentation only and not as a substitute for a formal radiological report. A wrist and hand MRI was also performed to assess bone marrow signal changes and fragment viability relevant to suspected AVN. A single

coronal MRI image was available; however, it was not accompanied by a complete imaging protocol, sequence details, or an official radiological interpretation, so MRI findings in this report are considered limited and require verification. CT scanning was not performed in this case, but it is noted as a clinical consideration that may be useful for evaluating the degree of union, malunion configuration, bone defect geometry, or humpback deformity in chronic scaphoid disease.

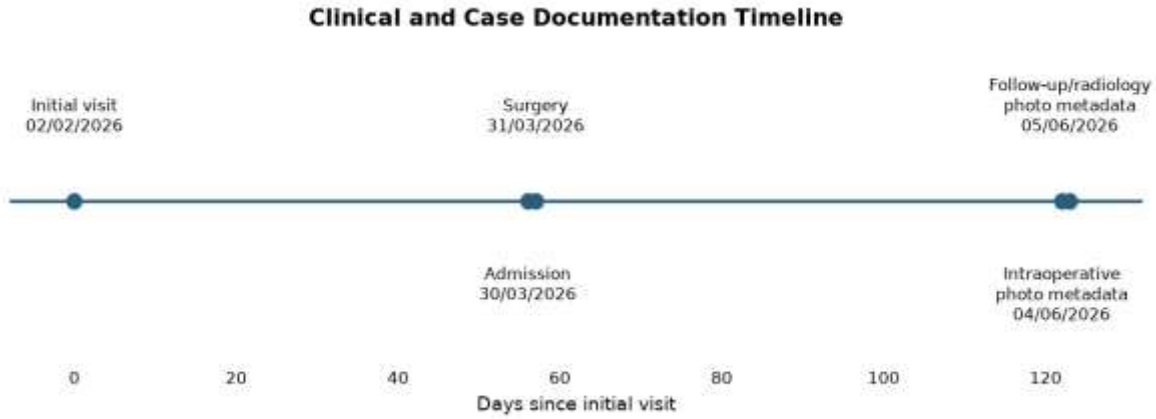

Figure 1. Clinical timeline and case documentation. Clinical/surgical dates are separated from image documentation metadata.

Intraoperative findings of scaphoid malunion with an approximately one-centimeter defect after osteotomy further supported the presence of a structural abnormality requiring reconstruction. The differential diagnosis for chronic radial wrist pain in this context included de Quervain tenosynovitis, occult ganglion, scapholunate ligament sprain, Kienbock disease, early carpal arthritis, and pain attributable to long-standing scaphoid nonunion. Localized scaphoid tenderness on examination and the intraoperative malunion findings more strongly supported a primary scaphoid pathology.

Figure 2. Comparison of scaphoid-view radiograph and coronal MRI of the left hand and wrist. Interpretation is limited in the absence of an official radiological report.

Therapeutic Intervention

The patient was admitted on 30 March 2026 and underwent surgery on 31 March 2026. The procedure was performed in the supine position under general anesthesia with orotracheal tube intubation. The operative field was prepared with povidone iodine and alcohol, then draped with sterile surgical

drapes. A palmar approach to the left wrist was used, with incision deepened layer by layer until the wrist joint capsule was exposed. The palmar approach was selected to allow direct access to the volar scaphoid region, which is particularly suited for defect correction and graft placement.

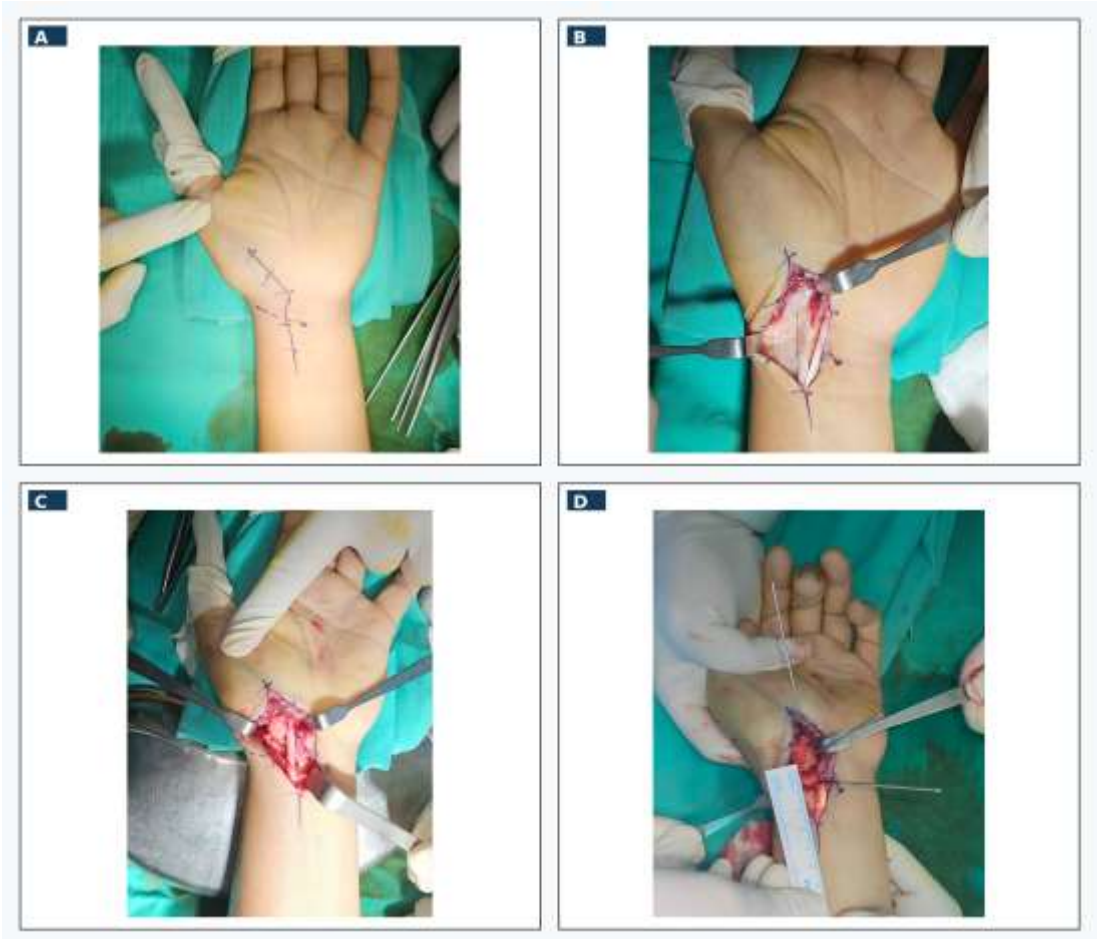

Figure 3. Intraoperative exposure via the palmar approach demonstrates the left scaphoid defect.

Intraoperatively, scaphoid malunion was confirmed. Osteotomy was performed, resulting in an approximately one-centimeter defect. This defect was filled with autologous iliac bone graft harvested from the ipsilateral iliac wing via an ilioinguinal approach. Autologous iliac bone graft was selected for its combined osteogenic, osteoinductive, and osteoconductive properties. Following graft placement, fixation was achieved using one headless compression screw measuring 2.4 mm in diameter and 26 mm in length. Implant position was confirmed under intraoperative C-arm fluoroscopy and judged to be satisfactory. The construct was assessed as stable. Estimated intraoperative blood loss was approximately 100 cc. The wound was irrigated, hemostasis was secured, and closure was performed layer by layer.

Figure 4. Sequential intraoperative documentation showing harvest of autologous iliac bone graft, graft placement into the scaphoid defect, and screw fixation.

Figure 5. Intraoperative C-arm fluoroscopy confirming implant position, and postoperative radiograph with thumb spica splint in situ.

Follow-Up and Outcome

On postoperative day zero, the patient was fully conscious and hemodynamically stable. Pain was controlled with multimodal analgesia, including an acute pain service infusion of fentanyl 300 mcg combined with ketamine 20 mg in 20 mL normal saline at 0.8 mL per hour, supplemented by oral paracetamol 500 mg every six hours and oral ibuprofen 400 mg every eight hours. Antibiotic prophylaxis was continued with cefazolin 2 × 1 gram on postoperative day one. Pain intensity was recorded at VAS 2–3. The surgical dressing was dry with no leakage, and the thumb spica splint was well applied and functioning appropriately. Tenderness at the surgical site was present, as expected in the early postoperative phase. Active distal finger range of motion was limited by the splint, but was encouraged as early rehabilitation to prevent digital stiffness. The left upper extremity was elevated to reduce postoperative edema. Distal neurovascular status remained intact, with no signs of perfusion deficit or sensory disturbance on initial evaluation.

Figure 6. Postoperative clinical photographs of the dorsal and palmar aspects of the left hand demonstrating wound condition and splint application.

Outcomes pending completion at subsequent follow-up include serial wrist range of motion assessment encompassing flexion-extension, radial-ulnar deviation, and forearm rotation. Grip strength comparison with the contralateral side; upper-extremity functional scoring with QuickDASH or DASH; radiological union assessment via serial plain radiography or CT; evaluation of the iliac donor site for pain, hematoma, infection, or local complications; monitoring for surgical complications including infection, persistent nonunion, implant loosening, wrist stiffness, and persistent pain; and documentation of

the time and capacity for return to work and daily activities.

DISCUSSION

The scaphoid acts as a carpal link that bears substantial load on the radial side of the wrist. Its vascularity is relatively vulnerable, especially because blood supply to the proximal portion depends on retrograde flow. This condition explains why disruptions of bone continuity, undiagnosed fractures, malunion, or nonunion can evolve into chronic pain and suspected AVN. [1–4]

Progressive ischemia of the proximal pole initiates a cascade of pathological changes, including subchondral collapse, fragmentation, and eventual scaphoid nonunion advanced collapse (SNAC). In SNAC, the altered mechanics at the radiocarpal and midcarpal joints accelerate cartilage wear in a predictable pattern, first affecting the radial styloid, then the entire radioscaphoid articulation, and finally the capitolunate joint. Recognition of this degenerative continuum is critical because it defines the window of opportunity in which surgical intervention can still achieve biological union and delay or prevent the need for salvage procedures such as proximal row carpectomy or partial wrist arthrodesis. [1,3,4] In the present case, the absence of a clearly documented acute injury and the duration of symptoms before presentation are consistent with a subacute or chronic process in which unrecognized or inadequately treated injury has led to the radiological and intraoperative findings described. The clinical presentation of persistent radial wrist pain, reduced grip strength, and restricted motion in a patient of productive age, therefore, aligned with the known natural history of scaphoid vascular compromise, reinforcing the rationale for active surgical management rather than prolonged conservative observation. [1–4]

MRI is used to assess bone marrow signal and fragment viability, while CT has the advantage of evaluating cortical bridging, defects, and three-dimensional deformity. Together, these modalities provide complementary information: MRI identifies signal abnormalities consistent with ischemia or osteonecrosis, whereas CT quantifies the structural geometry of the nonunion gap, humpback deformity, and articular surface congruence that are essential for preoperative planning. [3,4] In this case, MRI was planned, and one MRI image is available, but there is no official radiological report. Therefore, the diagnosis of AVN should be written as "suspected" or "consistent with clinical assessment and intraoperative findings," rather than as a final radiological diagnosis. Intraoperative findings, including bone texture, color, absence of bleeding, and fragmentation pattern, remain a valid and widely accepted adjunct to radiological assessment in confirming the degree of avascular change when formal imaging interpretation is incomplete. [3,4] The absence of a formal radiology report represents a limitation of the current workup and should be acknowledged in the case report. Future cases in similar clinical settings should prioritize obtaining a written radiological opinion to strengthen diagnostic certainty, guide implant and graft selection, and provide a defensible baseline for medicolegal documentation. Nonetheless, the combination of clinical examination, available imaging, and intraoperative observation is sufficient to support the diagnosis of suspected left scaphoid AVN/malunion and to justify the surgical approach undertaken in this patient. [3,4]

In scaphoid malunion/nonunion with a bone defect, the goals of surgery are to fill the defect, restore alignment, and provide stability so that bone union can occur. Autologous iliac bone graft remains widely used because of its biological properties supporting osteogenesis. The literature also discusses the choice between vascularized and nonvascularized bone grafts. Vascularized grafts are often considered in AVN, proximal pole nonunion, or revision cases, whereas nonvascularized grafts with

stable fixation can still be an option in selected cases. [7–10]

The headless compression screw is a common fixation choice for the scaphoid because it can deliver compression and reduce implant prominence on the articular surface. However, screw placement must be precise because the scaphoid is small and surrounded by articular surfaces. Intraoperative C-arm evaluation in this case showed that the implant position was judged to be good. Central axis placement within the scaphoid is the standard goal, as off-axis insertion risks cortical perforation, inadequate compression across the nonunion site, or iatrogenic articular damage. The combination of autologous graft and rigid screw fixation addresses both the biological and mechanical requirements for successful union. [1,8,9]

Immobilization with a thumb spica splint aims to protect the fixation construct and graft in the early phase. Early rehabilitation does not mean free wrist mobilization, but rather distal finger ROM exercises to prevent stiffness, elevation to reduce edema, and distal neurovascular monitoring. Gradual wrist mobilization should be guided by clinical and radiological evaluation, particularly once signs of bone union are present. Adherence to a structured rehabilitation program is important in the productive-age population to optimize the recovery of grip strength and range of motion, and to facilitate return to occupational and daily activities within a timeframe that minimizes the social and economic burden of prolonged disability. [2–4]

CONCLUSION

This case describes the management of Mr. A, a 29-year-old male, with chronic left palmar/wrist pain, suspected AVN/malunion of the left scaphoid, and intraoperative findings of scaphoid malunion with an approximately 1 cm defect. ORIF using a 2.4 mm x 26 mm headless compression screw, together with autologous iliac bone graft, was performed to fill the defect, improve stability, and support bone union. The immediate postoperative outcome showed a good clinical condition with controlled pain, a dry dressing, a functioning thumb spica splint, and intact distal neurovascular status. However, medium-term follow-up is still required to assess wound healing, donor-site complaints, implant position, union, ROM, grip strength, functional scores, and the ability to return to work.

Declaration by Authors

Acknowledgement: We would like to address our gratitude toward the Orthopaedic and Traumatology Department, Faculty of Medicine, Udayana University/ Ngoerah General Hospital, Denpasar, Indonesia, for facilitating this study.

Source of Funding: All funding is provided by the authors without any external funding.

Conflict of Interest: No conflicts of interest declared.

REFERENCES

1. [Kawamura K, Chung KC. Treatment of scaphoid fractures and nonunions. J Hand Surg Am. 2008;33(6):988–997.
2. Hayat Z, Varacallo M. Scaphoid wrist fracture. In: StatPearls. Treasure Island (FL): StatPearls Publishing; updated 2023.
3. AO Surgery Reference. Scaphoid waist fractures: definition and classification. AO Foundation. Accessed 6 June 2026.
4. American Academy of Orthopaedic Surgeons. Scaphoid fracture of the wrist. OrthoInfo. Accessed 6 June 2026. [URL to be verified at submission].
5. eJournal Kedokteran Indonesia. Submissions: author guidelines, manuscript structure, abstracts, tables, figures, ethics, and references. Faculty of Medicine Universitas Indonesia. Accessed 6 June 2026. [URL to be verified at submission].
6. Gagnier JJ, Kienle G, Altman DG, Moher D, Sox H, Riley D; CARE Group. The CARE guidelines: consensus-based clinical case reporting guideline development. J Med Case Rep. 2013; 7:223.
7. Riley DS, Barber MS, Kienle GS, Aronson JK, von Schoen-Angerer T, Tugwell P, et al. CARE guidelines for case reports:

explanation and elaboration document. J Clin Epidemiol. 2017; 89:218–235.
8. Duncumb JW, Best BJ, Nuttall D, et al. Bone grafting for scaphoid nonunion surgery: a systematic review and meta-analysis. Bone Joint J. 2022;104-B (5):549–558.
9. Van Nest DS, Reynolds M, Warnick E, Sherman M, Ilyas AM. Volar plating versus headless compression screw fixation of scaphoid nonunions: a meta-analysis of outcomes. J Wrist Surg. 2021;10(3):255–261.
10. Zondervan RL, Childe JR, Kustasz R, Hornbach EE. Scaphoid nonunions treated with nonvascularized bone grafting and screw fixation. J Wrist Surg. 2024; 13:24–30.
11. Testa G, Vescio A, Di Masi P, et al. Comparison between vascular and non-vascular bone grafting in scaphoid nonunion: a systematic review. J Clin Med. 2022;11(12):3402.
12. Karaismailoglu B, Guven MF, Erenler M, Botanlioglu H. The use of pedicled vascularized bone grafts in the treatment of scaphoid nonunion: clinical results, graft options and indications. EFORT Open Rev. 2020;5(1):1–8.

How to cite this article: Made Bramantya Karna, Benedictus Anindita Satmoko, Rafell Tantyo. Beyond fixation: structural scaphoid reconstruction for Preiser's disease with humpback collapse: a case report. *International Journal of Research and Review*. 2026; 13(7): 366-374. DOI: *10.52403/ijrr.20260738*

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