

Chronic Posterolateral Rotatory Instability of the Elbow with Anterior Radial Head Dislocation Managed by Collateral Ligament Reconstruction Using Peroneus Tendon Autograft: A Case Report

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LEARNING POINT OF THE ARTICLE

Chronic elbow instability following dislocation should prompt evaluation for ligamentous injury. Early recognition and anatomical reconstruction of the collateral ligament complexes using tendon autograft can restore joint stability and achieve good functional outcomes.

ABSTRACT

Introduction: Posterolateral rotatory instability (PLRI) is the most common pattern of chronic elbow instability, typically resulting from inadequately treated elbow dislocations. Failure to recognize associated ligamentous injuries at the time of initial management can lead to persistent instability and progressive functional impairment.

Case Report: We report a 46-year-old female who presented with persistent pain, instability, and restricted motion of the left elbow two months following closed reduction of an elbow dislocation. Clinical examination revealed positive PLRI tests on the affected side. Radiological assessment and intraoperative findings confirmed anterior radial head dislocation with complete disruption of both medial and lateral collateral ligament complexes. The patient underwent reconstruction of the collateral ligaments using a peroneus tendon autograft. The elbow was immobilized for three weeks postoperatively, followed by structured rehabilitation.

Conclusion: Chronic PLRI requires a high index of clinical suspicion. Timely diagnosis and surgical reconstruction using tendon autograft provide reliable restoration of elbow stability and good functional outcomes.

Keywords: Posterolateral rotatory instability, elbow dislocation, radial head dislocation, collateral ligament reconstruction, tendon autograft.

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INTRODUCTION

Elbow dislocation is the second most common large joint dislocation in adults after shoulder dislocation [1]. While simple dislocations are frequently managed with closed reduction and immobilization, associated soft tissue injuries—particularly to the ligamentous stabilizers—may go unrecognized. Failure to address these injuries can result in chronic instability, progressive functional limitation, and ultimately degenerative joint disease.

Posterolateral rotatory instability (PLRI), first described by O'Driscoll et al. in 1991, is the most common form of chronic elbow instability [1]. It results from insufficiency of the lateral ulnar collateral ligament (LUCL), the primary restraint preventing posterolateral subluxation of the ulnohumeral joint. In more severe cases,

progressive soft tissue disruption extends along the "circle of Horii," involving both the lateral and medial collateral ligament (MCL) complexes and producing gross instability [2].

Patients typically present with vague symptoms including pain, mechanical clicking, or a sense of the elbow "giving way," which often delays diagnosis [3]. Provocative clinical tests—the lateral pivot shift test, chair push-up test, and tabletop relocation test—are essential diagnostic tools [2]. Chronic cases rarely respond to conservative management, and surgical reconstruction using tendon autografts remains the standard of care [4,5].

We present a case of chronic PLRI with anterior radial head dislocation and complete disruption of both collateral ligament complexes, successfully managed with ligament reconstruction using a peroneus tendon autograft.

CASE REPORT

A 46-year-old female with no significant comorbidities presented to JSS Hospital, Mysore, with a two-month history of persistent left elbow pain, a sensation of instability, difficulty with activities of daily living, and restricted range of motion (ROM). Symptoms had persisted despite initial treatment elsewhere.

History

The patient sustained a slip-and-fall injury at home two months prior. She was diagnosed with a left elbow dislocation at a local hospital, where closed reduction under general anesthesia was performed followed by posterior slab immobilization. No formal ligamentous evaluation was undertaken at that time. Despite apparent radiological reduction, she continued to experience pain and instability with elbow motion.

Clinical Examination

Neurovascular assessment revealed intact sensation and palpable distal pulses bilaterally. Range-of-motion assessment demonstrated significant restriction on the affected side:

- Elbow flexion: 60–100° (left) vs. 0–145° (right); extension lag: 30–50°
 - Forearm pronation: 30–50°; supination: 20–40°
 - Shoulder ROM near normal (mild restriction in left rotations); mild wrist restriction on the left
- All four specific instability tests were positive on the left side and negative on the contralateral side:
- Posterolateral rotatory instability test: Positive
 - Lateral pivot shift test: Positive
 - Chair push-up test: Positive
 - Tabletop relocation test: Positive

Investigations

Initial post-reduction radiographs from the referring institution demonstrated satisfactory bony alignment with no evidence of fracture (Figures 1 and 2). Subsequent radiological assessment at our institution revealed anterior displacement of the radial head, disruption of the radiocapitellar line, and evidence of significant periarticular effusion.



Figure 1: Pre-reduction and post-reduction plain radiographs of the left elbow (AP and lateral views). Initial radiographs at the referring hospital demonstrated satisfactory bony alignment following closed reduction, with no fracture identified.



Figure 2: Subsequent plain radiographs of the left elbow demonstrating anterior displacement of the radial head and disruption of the radiocapitellar line, consistent with recurrent/chronic anterior radial head dislocation.

MRI of the left elbow (plain, 1.5T; Figures 3–5) revealed posterior and lateral subluxation of the elbow joint, anterior dislocation of the radial head, full-thickness tear of the radial collateral and lateral ulnar collateral bundles of the lateral collateral ligament, high-grade near full-thickness tear of the anterior and posterior bundles of the medial collateral ligament, and moderate joint effusion with synovial and capsular thickening. Triceps, biceps, and brachialis tendons were intact. No articular surface erosions were noted.

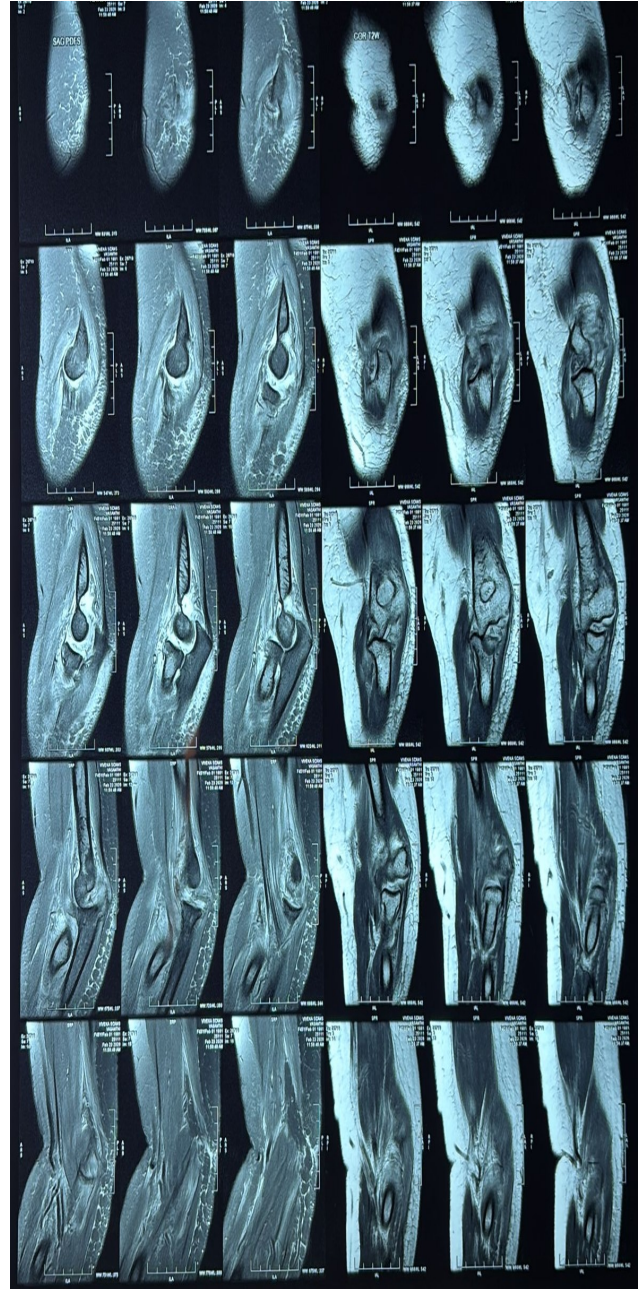


Figure 3: MRI left elbow — sagittal PDFS and T2W sequences demonstrating posterior and lateral subluxation of the elbow joint, anterior radial head dislocation, and significant periarticular effusion with synovial thickening.

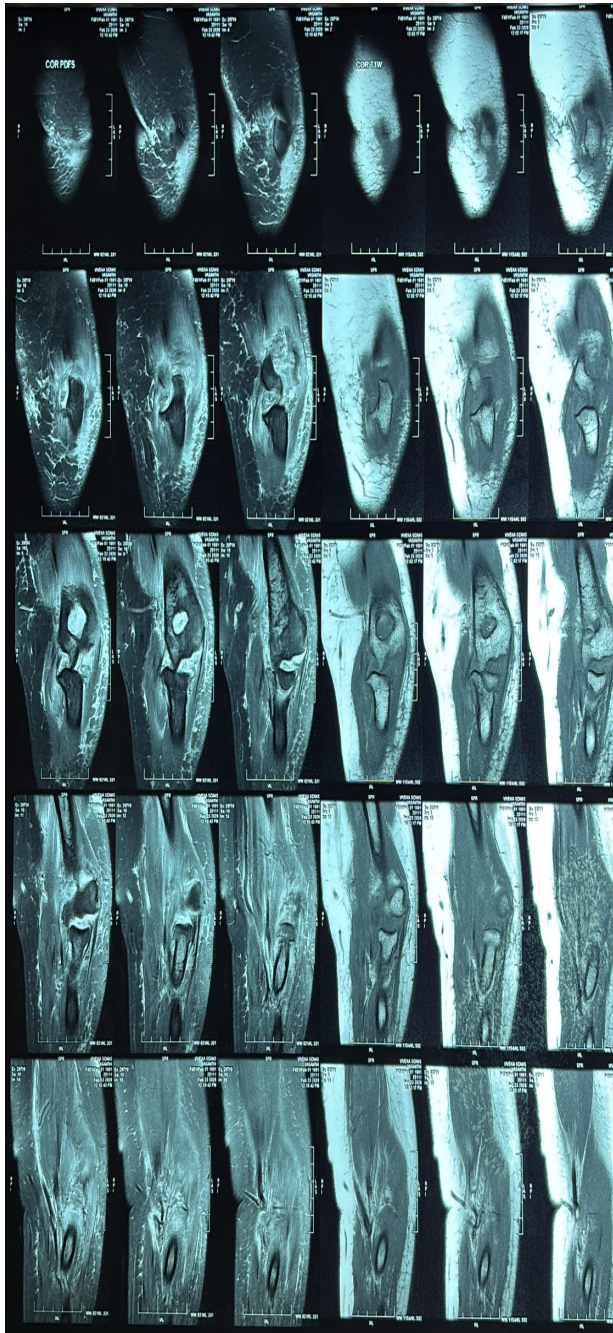


Figure 4: MRI left elbow — coronal PDFS and T1W sequences confirming full-thickness tear of the lateral collateral ligament complex and high-grade near full-thickness tear of the medial collateral ligament complex.

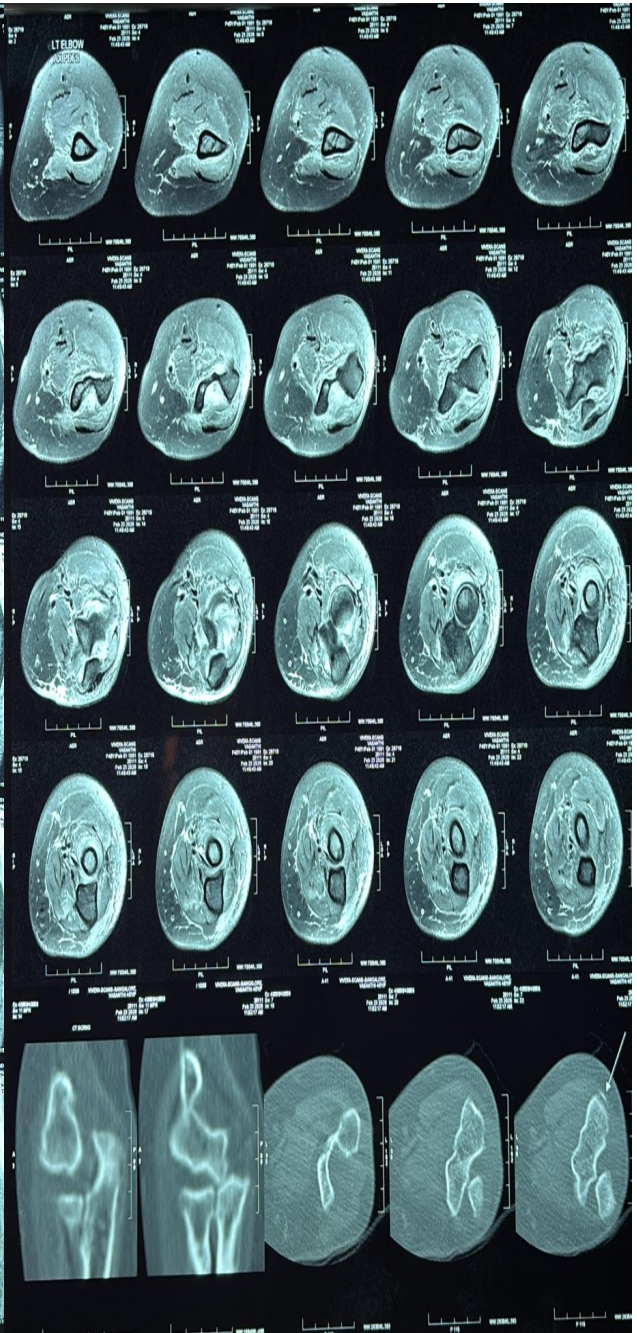


Figure 5: MRI left elbow — axial PDFS sequences and supplementary CT coronal/axial views confirming anterior radial head dislocation with disruption of the radiocapitellar line and no evidence of associated fracture.

MRI - LEFT ELBOW JOINT - PLAIN

History: Trauma. 45Y/Female.

Technique: Multiplanar Multisequence MR imaging.

Findings:

Bones & Joints:

There is posterior and lateral subluxation of the elbow joint. The distal humerus is placed laterally in relation to the proximal ends of the radius and ulna.

Anterior dislocation of the radial head noted with disruption of the radiocapitellar line.

Mild subchondral edema is noted in the distal humerus. No evidence of articular surface erosions or abnormal periosteal reactions.

Moderate joint effusion is noted in the elbow joint with evidence of synovial thickening and capsular thickening.

Medial epicondyle and flexor tendon are normal. Lateral epicondyle and extensor tendons are normal.

Anterior and posterior fat pads are displaced by the effusion.

Articular cartilage: No evidence of any fractures.

Tendons:

Triceps tendon: Intact.

Biceps tendon: Intact.

Brachialis tendon: Intact.

Ligaments:

Lateral collateral ligament: There is a full thickness tear of the radial collateral and lateral ulnar collateral bundles. The annular ligament show partial thickness tear. Evidence of associated capsular thickening is noted.

Medial collateral ligament: There is high grade near full thickness tear of the anterior and posterior bundles. The transverse bundle is intact.

Neurovascular bundle: Normal.

Periarticular soft tissue swelling noted.

IMPRESSION:

- Posterior and lateral subluxation of the elbow joint
- Anterior dislocation of the radial head with disruption of the radiocapitellar line
- Full thickness tear of the radial collateral and lateral ulnar collateral bundles of the lateral collateral ligament
- High grade near full thickness tear of the anterior and posterior bundles of the medial collateral ligament
- Moderate elbow joint effusion with associated synovial and capsular thickening - to r/o infective etiology
- Mild subchondral edema in the distal humerus

3. Complete disruption of both medial and lateral collateral ligament complexes

Surgical Management

The patient underwent reconstruction of the medial and lateral collateral ligament complexes using a peroneus longus tendon autograft. A lateral surgical approach was used (Figure 8), with the incision planned along the lateral column of the elbow as per standard technique. Intraoperative findings confirmed complete disruption of both ligament complexes and anterior displacement of the radial head (Figure 9).

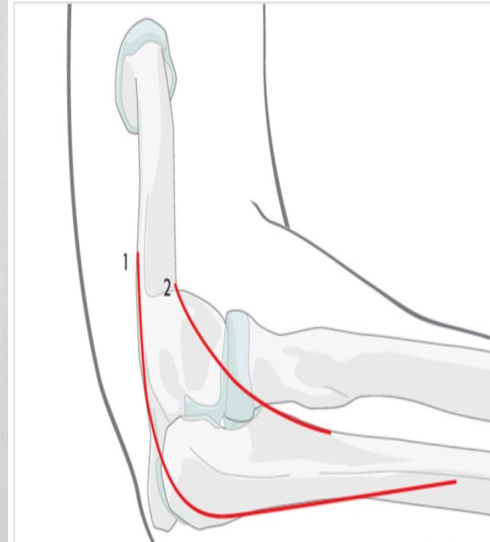


Figure 8: Schematic illustration of the lateral elbow surgical approach used for collateral ligament reconstruction. The incision (1) is placed over the lateral column with the deeper interval exposing the lateral collateral ligament complex (2).

Figures 6–7: Formal MRI report. Impression confirms: posterior and lateral subluxation; anterior radial head dislocation with radiocapitellar line disruption; full-thickness LCL tear; high-grade MCL tear; moderate joint effusion.

Diagnosis

Based on clinical and radiological evaluation:

1. Chronic posterolateral rotatory instability of the left elbow
2. Anterior radial head dislocation



Figure 9: Intraoperative photograph demonstrating the lateral elbow exposure. The disrupted lateral collateral ligament complex is visualized with complete loss of ligamentous continuity and associated synovial proliferation consistent with chronic instability.

The peroneus longus autograft was harvested from the ipsilateral lower limb and prepared for use. Graft passage and fixation were performed anatomically at the isometric points of both the LUCL and the MCL. The graft was tensioned and secured with the elbow in appropriate flexion (Figures 10 and 11).

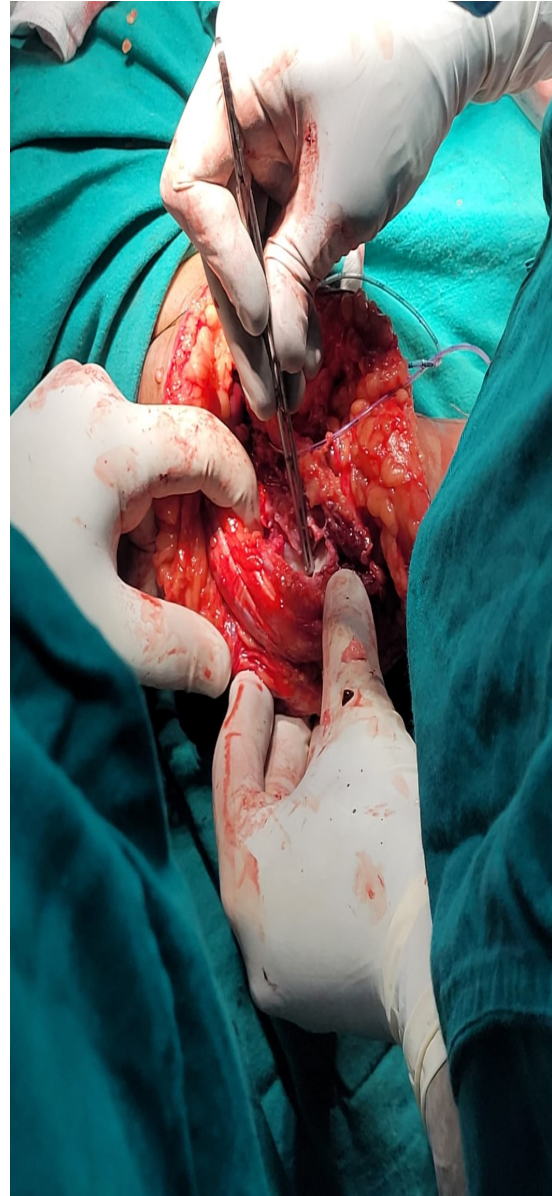


Figure 10: Intraoperative photograph showing graft passage through bone tunnels during collateral ligament reconstruction. The peroneus longus autograft is visualized being routed through the lateral collateral ligament footprint.



Figure 11: Intraoperative photograph demonstrating tensioning and fixation of the peroneus longus autograft for LUCL reconstruction, with the elbow held in appropriate flexion to restore isometric ligamentous tension.

Postoperative Protocol and Outcome

The elbow was immobilized in an above-elbow posterior slab for three weeks postoperatively. Graduated mobilization was then commenced under physiotherapy supervision. Postoperative radiographs confirmed satisfactory joint alignment and restoration of the radiocapitellar relationship (Figure 12). At follow-up, the patient demonstrated significant reduction in pain, marked improvement

in elbow stability, progressive improvement in ROM, and no postoperative complications.

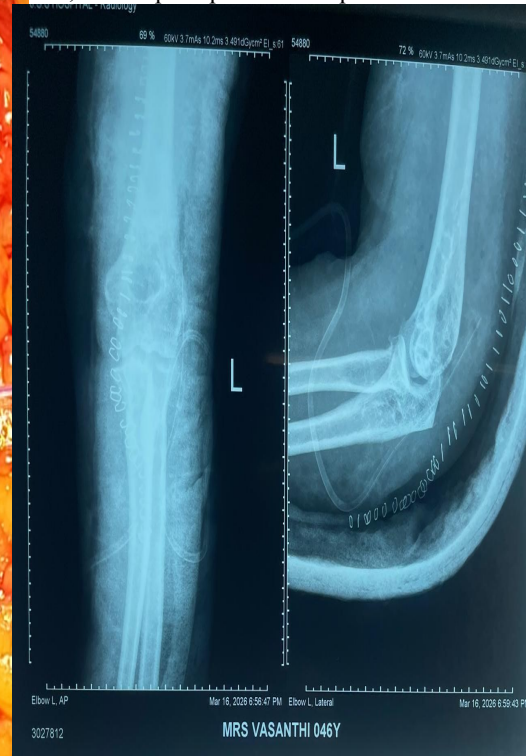


Figure 12: Postoperative plain radiographs (AP and lateral views, left elbow, demonstrating satisfactory restoration of the radiocapitellar relationship and anatomical alignment of the elbow joint following collateral ligament reconstruction.

DISCUSSION

PLRI is frequently underdiagnosed in the acute setting, where clinical attention is directed at achieving bony reduction without formal assessment of ligamentous integrity. The LUCL is the primary stabilizer resisting posterolateral subluxation, and its disruption—if unaddressed—leads to progressive instability that may ultimately involve the MCL along the circle of Horii [3,4].

In the present case, initial post-reduction radiographs demonstrated satisfactory alignment, likely contributing to an underestimation of the degree of soft tissue injury. The patient's subsequent course of persistent pain and instability is consistent with the classical clinical spectrum of PLRI. The additional finding of anterior radial head dislocation in the chronic setting underscores the extent of ligamentous disruption when both collateral complexes are involved, confirming the MRI findings of complete LCL tear and high-grade MCL disruption.

Clinical diagnosis relies heavily on provocative examination. The lateral pivot shift test is the most specific but may require examination under anesthesia due to patient guarding. The chair push-

up and tabletop relocation tests, reproducible in the outpatient setting, were both positive in this patient and supported the clinical diagnosis [2,6].

MRI of the elbow is the investigation of choice in suspected chronic instability, providing direct visualization of ligamentous disruption, articular status, and periarticular soft tissue changes. In our case, MRI confirmed the full extent of injury—findings that directly informed the operative strategy of dual-complex reconstruction.

Surgical reconstruction is the definitive treatment for chronic PLRI [5,6]. Several graft options exist, including palmaris longus, gracilis, and triceps fascia. The peroneus longus tendon was selected in this case for its superior length and tensile strength—advantages that are particularly relevant when reconstruction of both the LUCL and MCL is required. The graft provided adequate tissue for anatomical reconstruction of both complexes [7].

The postoperative radiographs confirmed restoration of the radiocapitellar relationship, and the patient's clinical course was uncomplicated. Long-term follow-up with validated functional outcome scores (e.g., MEPS, ASES-E) and serial imaging would strengthen the documentation of outcomes in future reports.

CONCLUSION

Chronic posterolateral rotatory instability should be suspected in any patient with persistent elbow symptoms following dislocation, particularly when initial management did not include formal ligamentous assessment. Systematic clinical examination with provocative tests, MRI evaluation, and timely surgical reconstruction using tendon autograft are effective in restoring elbow stability and function, with good outcomes when followed by structured rehabilitation.

Clinical Message

Missed ligamentous injuries in elbow dislocations can lead to chronic instability with progressive functional impairment. A high index of suspicion, MRI evaluation, and timely anatomical reconstruction are key determinants of successful outcomes.

Patient Consent

The patient provided informed written consent for the publication of this case report, clinical images, and radiological data.

Competing Interests

The authors declare that they have no competing interests.

Authors' Contributions

[Authors to complete per ICMJE criteria: list each author's specific contribution, e.g., study

conception, clinical management, data collection, manuscript drafting and revision, final approval.]

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