

A Novel Minimally Invasive Double Endobutton Technique for Distal Radioulnar Joint (DRUJ) Dislocation: A Case Report

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ABSTRACT

Distal Radioulnar Joint (DRUJ) Dislocation is a common underdiagnosed wrist injury, with 50% of cases missed in the acute phase. Delayed diagnosis and suboptimal management can result in chronic instability, pain, and functional impairment. The endobutton technique has emerged as a minimally invasive alternative for DRUJ stabilisation compared to conventional methods. We shared a case of a 33-year-old woman with DRUJ dislocation with ulna subluxation posteriorly without any fractures, fixed with minimally invasive surgery using the endobutton technique, resulting in a Disabilities of the Arm, Shoulder, and Hand (DASH) score of 0 three weeks post-surgery. Successful restoration of DRUJ function in daily activities suggests the endobutton technique could become a preferred therapy option in the future.

Keywords:

distal radioulnar joint dislocation, minimally invasive stabilisation, endobutton technique, DASH score, wrist injury

INTRODUCTION

Dislocation of the distal radioulnar joint (DRUJ) is a common wrist injury often caused by trauma or chronic inflammation that damages the Triangular Fibrocartilage Complex (TFCC). This joint connects the distal radius and ulna and allows forearm rotation (pronation and supination)¹. The TFCC plays a key role in stabilising the DRUJ by cushioning the ulnar head and preventing excessive wrist movement. Poorly managed DRUJ instability can lead to chronic dysfunction of the wrist and forearm, persistent pain, reduced motion, weakness, and long-term complications such as degenerative².

Conventional treatments for DRUJ dislocation include open surgical procedures like Darrach's procedure, hemi-resection, Sauvé-Kapandji, and ulnar head arthroplasty. More recently, minimally invasive techniques such as the double endobutton technique are now preferred due to less soft tissue damage and faster recovery³. Reports of applying the double endobutton technique for isolated DRUJ dislocation without fracture are extremely limited, and no such cases have previously been reported from Indonesia. This highlights a significant knowledge gap regarding its role in isolated DRUJ injuries. Our case demonstrates that the minimally invasive double endobutton technique can provide stable fixation, preserve soft tissue, allow early mobilisation, and achieve excellent short-term functional outcomes, suggesting its potential as a novel alternative to conventional methods.

CASE REPORT

A 33-year-old female patient presented with wrist pain following slipping and landing on her right hand to support her body. The wrist pain was initially manageable with pain relievers but worsened and interfered with activities over the following days. The patient experienced pain in the right wrist, visible deformity, and inability to rotate her forearm (Fig 1a). The DASH score before surgery was 35.

Physical examination revealed dorsal protrusion of the ulnar head and positive piano key test results. Wrist movement was limited, but finger movement was normal. There were no sensory or motor deficits, and the distal pulse and skin were intact.

Radiographic anteroposterior and lateral examinations (Fig 1b, c) showed no bone injuries. The distance between the radius and ulna was >5.5mm. On the lateral view, ulna displacement posteriorly was observed.

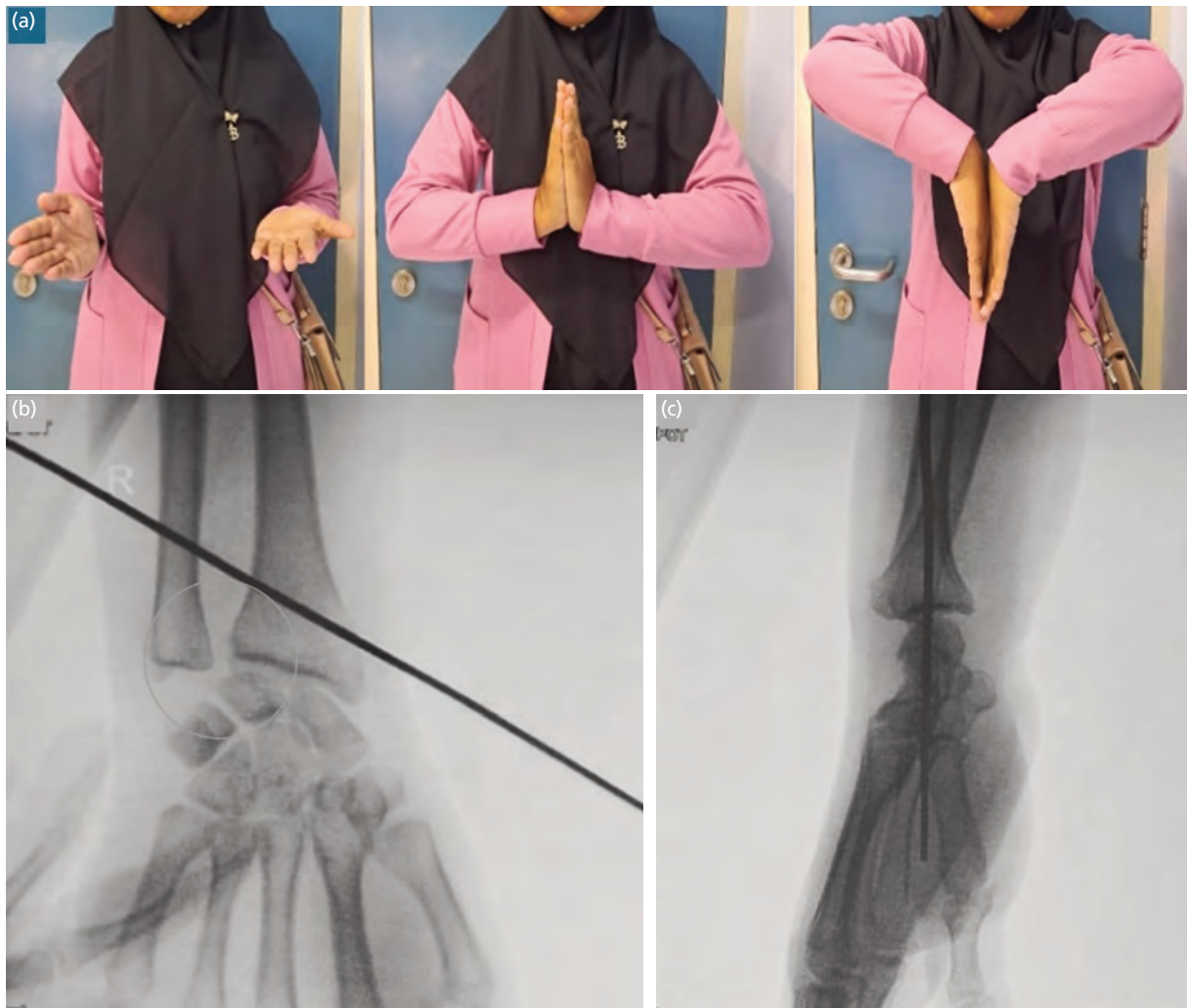


Fig. 1: Pre-operative assessment. (a) Clinical photos demonstrating pre-operative limitation in wrist pronation and supination. (b and c) Fluoroscopic images before surgery with guidewire placement from distal ulna to distal radius, showed a gap between the radius and ulna $>5.5\text{mm}$.

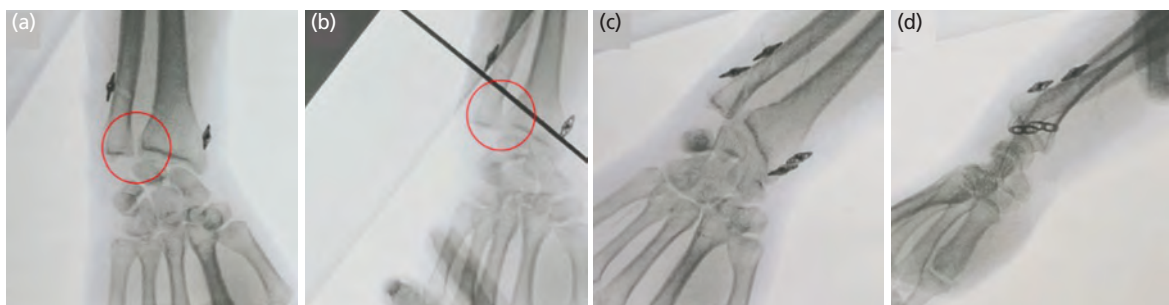


Fig. 2: Post-operative radiographic evaluation after the placement of the double suture endobutton fixation. (a, b) AP and oblique fluoroscopic views showing improved alignment of the DRUJ, the gap between the radius and ulna decrease to $\pm 2\text{mm}$. (c, d) Lateral and oblique views confirming proper positioning of the endobutton implants.

The patient was treated with a minimally invasive double endobutton technique to stabilise the DRUJ without using K-wires. A small incision was made on the back of the wrist near the ulnar head. Using C-arm fluoroscopy, a guidewire was inserted from the ulna to the radius, about 5 – 10mm above the joint. A 2.7mm drill was used to create a tunnel between the bones. A double endobutton suture was passed

through the tunnel, with one button fixed on the ulna and the other on the radius. The suture was tightened to bring the two bones together and restore joint stability by mimicking the function of the injured ligaments. Post-operative radiographs confirmed good alignment and implant position (Fig 2).



Fig. 3: Clinical evaluation of wrist range of motion three weeks after endobutton fixation, showing early functional recovery.

The patient was placed in a volar forearm splint for one week to reduce swelling and pain after surgery, followed by a physiotherapy program focusing on gentle wrist movements. Weekly follow-ups were conducted to monitor progress. By the third week, the patient showed full pain relief and significant functional recovery (Fig. 3), with the DASH score improving from 35 to 0. Wrist mobility was fully restored, including flexion and extension ($0 - 90^\circ$), ulnar deviation ($0 - 20^\circ$), and radial deviation ($0 - 30^\circ$). The patient successfully returned to daily activities such as writing, riding a motorcycle, gardening, and light sports without any limitations.

DISCUSSION

Distal radius fractures are among the most common upper extremity injuries, while the incidence of DRUJ dislocation varies widely. Studies indicate that DRUJ injuries or dislocations often lead to chronic pain, reduced range of motion, and decreased grip strength¹. DRUJ injuries are generally classified as either simple or complex. Simple injuries usually involve subluxation without associated fractures or significant ligament damage and may spontaneously reduce after trauma. Complex injuries are characterised by more severe damage and complications such as ulna or ulnar head fractures, proximal or distal radius fractures, and joint dislocations³.

DRUJ dislocations are also classified based on the position of the ulnar head to the radius. Dorsal dislocations (ulnar head shifts backward) are more common than volar dislocations (ulnar head shifts toward the palm). Dorsal dislocations are more stable when the forearm is in supination, while volar dislocations are more stable in pronation. DRUJ dislocations without associated bone fractures are rare and usually occur dorsally, often due to hyperpronation and extension injuries^{3,4}. A prominent ulnar head with limited ability to supinate suggests possible injury to the DRUJ's secondary stabilisers of the patient.

The normal range of forearm rotation (pronation and supination) is about 150 to 180 degrees, with the radiocarpal joint contributing an additional 30 degrees. The axis of rotation typically lies near the distal radius or proximal ulna. At the DRUJ, pronation causes the ulnar head to move dorsally, while supination moves it palmarly. This rotation involves sliding and rolling between the ulnar head and the sigmoid notch of the radius. The sigmoid notch shifts approximately 15mm on the transverse axis and 10mm on the coronal axis. DRUJ dislocations are often associated with damage to supporting structures, such as the ulnar collateral ligament, TFCC, anterior and posterior radioulnar ligaments, and the pronator quadratus².

Assessment in the third week revealed a return to the patient's pre-injury wrist functional ability. A significant decrease in the DASH score after surgery indicated improved function, supporting the effectiveness of the minimally invasive endobutton technique for DRUJ injury. The DASH score is a 30-item questionnaire that reliably measures physical function and disability in upper-extremity conditions, including distal radius fractures. The improvement in the patient's DASH score further confirms the positive outcome of the procedure^{1,5}.

The standard treatment for dorsal DRUJ dislocation typically involves closed reduction under anaesthesia, followed by immobilisation with above-elbow casting for approximately six weeks. While this method may restore joint stability, it limits early mobilisation and may lead to stiffness^{3,4}. These conventional techniques may increase the risk of joint stiffness, infection, or the need for hardware removal⁵.

Compared to conventional methods, the endobutton technique offers a minimally invasive and effective alternative for stabilising DRUJ dislocation. It reduces the need for secondary procedures, shortens operative time, and minimises complications. This technique avoids prolonged immobilisation, minimises damage to surrounding anatomical structures, and promotes early functional recovery⁵.

The double endobutton was chosen over a single endobutton based on biomechanical evidence indicating that dual fixation provides superior rotational and translational stability across the DRUJ. While the endobutton technique has been reported primarily in cases of DRUJ instability associated with distal radius fractures, its application in isolated DRUJ dislocation without fracture remains rarely described in the literature^{3,5}. To our knowledge, this is one of the few reported cases worldwide, and the first from Indonesia, demonstrating the successful use of a minimally

invasive double endobutton technique in this context. This adaptation not only enabled early range of motion exercises but also resulted in rapid functional recovery with a DASH score of 0 at three weeks, highlighting its potential as a novel alternative to conventional methods.

CONFLICT OF INTEREST

The authors declare no potential conflicts of interest.

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