

Arthroscopic-Assisted Reduction of Intra-articular Distal Radius Fracture



Yukio Abe, MD, PhD*, Kenzo Fujii, MD

KEYWORDS

• Wrist • Distal radius fracture • Intra-articular fracture • Arthroscopy • Articular step-off

KEY POINTS

- Wrist arthroscopy is an efficient adjunct for intra-articular distal radius fracture fixation. However, performing wrist arthroscopy during the plate fixation is troublesome with the vertical traction applied and released.
- To facilitate the procedure, the authors developed a surgical technique, plate presetting arthroscopic reduction technique (PART), using a palmar locking plate. Since July 2005, they have performed PART for 248 intra-articular distal radius fractures with good and excellent results.
- Arthroscopic-assisted reduction of intra-articular fragments is superior to fluoroscopic assisted. PART also allows detection of intra-articular migration of fracture fragments, screw protrusion, and associated soft tissue injuries.

INTRODUCTION

Distal radius fracture (DRF) is one of the most common injuries not only for hand surgeons but also for general orthopedic or trauma surgeons. Although manual reduction and cast immobilization had been the main treatment traditionally, surgical intervention is often needed for irreducible fractures or uncontrolled fracture reduction. Numerous surgical procedures have been described for these fractures; however, the latest development of a palmar locking plate (PLP) fixation markedly changed the treatment of DRF.¹⁻³ PLP fixation creates a more rigid mechanical construct and allows early mobilization with the goal of an improved functional outcome. The functional outcome of DRF is considered to be affected by the extra-articular alignment, anatomic reduction of the articular surface, intra-articular soft tissue injuries, and postoperative

complications.⁴⁻¹² Wrist arthroscopy is currently recognized as an important adjunctive procedure in the management of DRF, because arthroscopically assisted reduction provides excellent visualization of the articular condition not only with regard to anatomic restoration of articular fragments but also to evaluate and treat intra-articular soft tissue injuries.¹³⁻¹⁵ It would be easier if used in conjunction with percutaneous pinning and external fixation. However, wrist arthroscopy becomes troublesome when PLP fixation is performed because vertical traction has to be both applied and released during the surgery. Therefore, the authors have developed a plate presetting arthroscopic reduction technique (PART) using a PLP that can simplify the combination of plating and arthroscopy.¹⁶⁻¹⁸ This article describes the procedure of PART and its effectiveness for the treatment of DRF.

Department of Orthopaedic Surgery, Saiseikai Shimonoseki General Hospital, 8-5-1, Yasuoka-cho, Shimonoseki 759-6603, Japan

* Corresponding author.

E-mail address: handsurgeonabe@jcom.home.ne.jp

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Fig. 1. 3D CT is valuable for making a plan of how to reduce the fragments.

INDICATIONS/CONTRAINDICATIONS

Although various factors affect the prognosis of treatment of DRF, accurate restoration of the alignment of the radius with its carpal and ulnar articulations, anatomic reduction of articular surface, and treatment of associated intra-articular soft tissue injury are the most important factors. Wrist arthroscopy has the advantage not only of a direct visualization of the reduction of intra-articular fragments but also of the possibility to manage intra-articular soft tissue injuries. Intra-articular soft tissue injuries were found to have almost the same incidence in both extra-articular and intra-articular DRF in the authors' institute, and they consider wrist arthroscopy for any type of DRF. However, they consider that low-activity patients, extra-articular fractures in the elderly, open fractures, and DRF associated with other multiple fractures are contraindications for PART.

SURGICAL TECHNIQUE

Preoperative Planning

Besides the standard posteroanterior and lateral radiographs, oblique radiographs at 45° of supination and pronation of the forearm, and computed tomography (CT), including 3-dimensional (3D) reconstruction, are valuable in deciding a surgical strategy for the treatment of DRF (**Fig. 1**).

Preparation and Patient Positioning

The arthroscopy monitor, the fluoroscopy and the arthroscopic equipment, including a small-diameter arthroscope with a 30° field of vision, a shaver, and a radiofrequency device must be positioned conveniently (**Fig. 2**). Even though dry arthroscopy was recently recommended to

prevent extravasation and for its convenience,¹⁹ the authors prefer wet technique. A palmar approach is used to apply the plate before the arthroscopic procedure. Saline can flow away readily through the palmar incision, especially in an intra-articular fracture. Therefore, the authors are less concerned about swelling during the arthroscopy. Blood clots and debris can be easily removed. The wet technique can also prevent the heat problem in using a radiofrequency device. The patient, who has been placed under general or regional anesthesia, is placed in the supine position with the arm draped freely over a hand table. A tourniquet is wrapped around the upper arm and is inflated.

Surgical Approach

Exposure

A longitudinal skin incision is made between the flexor carpi radialis (FCR) tendon and the radial artery (so-called Henry approach; **Fig. 3**). The length



Fig. 2. The scene wrist arthroscopy during surgery.

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