

# A new method for effective screw positioning to support the subchondral bone in volar locking plate fixation in distal radius fractures

Kazuaki MITO and Wataru INOKUCHI

Department of Orthopaedic Surgery, Nerima General Hospital

## Introduction

- In treatment of distal radius fractures (DRF), one of the important technical points is to position the distal screws next to the subchondral bone in order to support the fracture adequately and to minimize the postoperative correction loss which adversely affect the outcome clinically.
- However, accurate positioning of the screws is technically difficult because the subchondral bone line is unclear with X-ray image during operation.
- The purpose of this study is to evaluate the effectiveness of using VLP plates and the use of cannulated screws for subchondral support of distal screws.

## Subjects and Methods

### 【Subjects】

- 29 patients (29 wrists) were treated between October 2014 and June 2015.
- Right-left:12/17 wrists
- Sex(male/female): 6/23 patients
- Age: 24-90 years (mean, 63.2years)
- Follow-up period: 6-250 days (mean, 96days)
- 28 patients had distal radius fractures.
- One patient had correction osteotomy for the radius malunion.
- AO classification [number of wrists]: A[6], B[3], C[19]

### 【Operation methods】

- Our newly introduced method of positioning cannulated screws to effectively support subchondral bone, available in a VLP (Global Form®, Nexmed, Chiba, Japan(Fig.1)) is as follows(Fig.2);
- [1] One 0.8mm guide wire is inserted along subchondral bone with feeling the touch of bone.
- [2] One 2.4mm cannulated locking screw is used over the guide wire in the most distal row.

### 【Evaluation】

- 'a-distance'; The minimum distance between screws of the first row and joint surface by CT images just after the operation.
- The loss of correction by using radiography.



Fig.1 Global Form® (Nexmed, Chiba, Japan)(left) is a variable-angle volar locking plate and available for use of cannulated screws in distal row. Its cannulated screw positioning system(right) (variable outer cylinder (→), Inner cylinder (⇒) for guide wire and a 0.8mm guide wire(\*)). Cannulated screws were placed in the most distal row (↓).

## Results

- 'a-distance': 1.15mm in average (0-3.91 mm)
- No penetration of screws to the joint.
- The correction loss:
  - volar tilt: -1.6-1.3 degrees(mean, -0.075 degrees)
  - radial inclination:-10.3-0degrees(mean,-2.78degrees)
  - ulna variance: -0.75 mm (mean,-1.64-0 mm)

## Conclusions

- Our technique can be one effective method to position distal locking screws for achieving subchondral support in treatment of DRF using VLP.

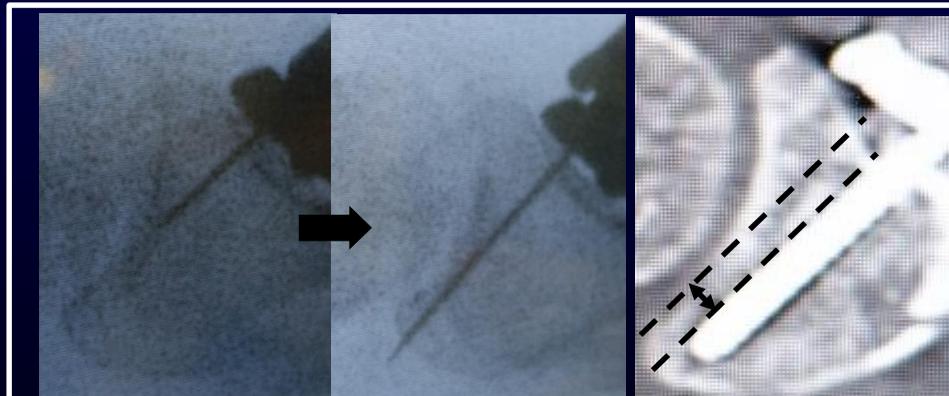


Fig.2 Our newly introduced method of positioning cannulated screws to effectively support subchondral bone. Once a 0.8mm guide wire is hit subchondral bone (left), the direction of the wire is changed more vertically and inserted along subchondral bone with feeling the touch of bone (middle). A slice of CT sagittal image just after operation (right). The distance of arrow (↔) is defined as 'a-distance'.