



Four-Corner Fusion with a Locking, Circular Dorsal Plate



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Introduction

- Four-corner arthrodesis (FCA) has been demonstrated to be an acceptable salvage procedure for treatment of advanced wrist arthritis.
- The use of metallic circular plates for FCA has generally resulted in inconsistent outcomes.
- More recently, a locking dorsal circular plate (LDCP) composed of polyether-ether ketone (PEEK) has been introduced (Xpode®; TriMed Inc., Santa Clarita, CA).
- In theory, this plate allows optimal locking screw placement intra-operatively and more accurate assessment of fusion using plain film imaging studies.

Materials and Methods

- A retrospective chart review of all patients who underwent FCA with an Xpode® between 1/1/2008 and 12/31/2012.
- 26 surgeries in 24 patients were identified for analysis. 18 patients could be contacted for follow-up, and of those, 11 patients (13 wrists) were able to return to clinic for up to date measurements.
- Patient demographics, pre-operative and post-operative range-of-motion, grip strength, complications and radiographic fusion status were collected when available from the medical records of all patients
- All patients contacted were asked to complete the Patient Rated Wrist Evaluation (PRWE)
- A paired t-test was used to compare means and a p-value less than 0.05 was considered statistically significant.

Range of Motion

	Pre-Operative	Post-Operative	p value
Flexion (°)	33.2	23.3	0.0123
Extension (°)	29.6	46.5	0.0076
Flexion/Extension Arc (°)	62.9	69.8	0.3455

Patient Rated Wrist Evaluation Outcomes*

Pain	3.94/10
Pain at Worst	5.6/10
Frequency of Pain	4.1/10
Function	3.29/10

*Average follow-up of 31.3 months



Fig 1



Fig 2

Results

- One patient (4%) required total wrist fusion 4 months after index procedure
- Of the 25 remaining wrists available for analysis, acceptable fusion was demonstrated in 20 (80%) (Figures 1 and 2). Partial fusion occurred in 5. No wrist demonstrate complete non-union
- Bone graft from the distal radius, scaphoid and remaining remnants, or a combination both was used
- Two wrists demonstrated radiographic evidence of screw breakage. Neither patient requested surgical removal for pain
- Two patients underwent hardware removal, one secondary to dorsal impingement and persistent pain, the other during a secondary surgery for contracture release. Both reported only moderate improvement in stiffness following removal
- Grip strength at follow-up on dynamometer setting II averaged 76.5% (range: 30 to 110.9%) of the uninjured side

Discussion

- At early and mid-term follow-up, FCA using the Xpode® cup demonstrated satisfactory bony union and acceptable outcomes regarding pain and functionality
- Outcomes were similar to those reported of other constructs
- The radiolucent nature of the plate, however, allows for easy evaluation of intra-operative screw placement and post-operative fusion status and possible screw breakage