Treatment of Unstable Distal Radius Fractures with a Novel Non-spanning External Fixation Device Compared to a Historical Control Group

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Introduction:

Recent trends favor the use of volar locking plates for fixation of complicated intra-articular distal radius fractures. We hypothesize that no differences in radiographic and clinical outcomes exist between patients treated with non-spanning external fixation and historical controls with intra-articular distal radius fractures.

Materials and Methods:

A review of twenty-three patients with distal radius fractures treated with a new external fixation device (Nutek NBX) was completed. Clinical evaluation of nine patients available for follow-up was completed at an average of 25 months. Radiographic assessment of patients was completed based on final x-rays. These data are compared to pooled data from historical controls treated with volar locked plating internal fixation. The majority of fractures in our group (eighteen) are classified as AO 23-C. Average age of our patient population is 62.8 years. Outcomes include active range of motion in wrist flexion, extension, radial and ulnar deviation as well as grip and pinch strength. Disabilities of the Arm, Shoulder, and Hand (DASH) scores, Mayo wrist scores, patient rated wrist evaluation (PRWE), and radiographic parameters of volar tilt, radial inclination and radial height are also evaluated.

Results:

Radiographic evaluation demonstrated improvement of volar tilt, radial inclination and radial height from -16°, 16°, and 5mm respectively preoperatively to 4°, 23°, and 8 mm on final x-rays. Compared to the patient's contralateral side, mean percentages for flexion, extension, radial and ulnar deviation, supination and pronation are 88% (range 70%-108%), 97% (76%-150%), 145% (72%-350%), 107% (79%-193%), 101% (94%-114%), and 100% (89%-112%) respectively. Grip and pinch strength compared to contralateral are 101% (range 83%-134%) and 97% (65%-119%) respectively. Average scores of DASH, PRWE, and Mayo are 11.6, 11.4, and 81.1 respectively. Compared to pooled data from nine historical control studies, our patients demonstrated statistically significant better motion in wrist flexion, ulnar and radial deviation, forearm pronation, and radiographic radial inclination. No differences between groups were seen with wrist extension and forearm supination as well as DASH scores. Volar tilt was the only measurement in which our data were statistically less than historical controls (4.1° versus 6°).

Conclusions:

- Complicated intra-articular distal radius fractures may be treated appropriately with non-spanning external fixation.
- Clinical and radiographic outcomes of patients treated with non-spanning external fixation are comparable to those treated with open reduction and internal volar locked plating.
- Non-spanning external fixation should be considered as a treatment option for older patients with unstable intra-articular comminuted distal radius fractures.