

Distal radius fractures are the most common types of break to the arm bones. Conservative treatment in unstable fracture types cannot guarantee healing of the bones in a correct anatomical position. Locking plate osteosynthesis is at present regarded as the method of choice in surgical treatment of all types of distal radius fractures. An issue to be solved concerns the role for intramedullary implants in these indications. The aim of our study was to find the optimal indication for each of the osteosynthesis method currently used in distal radius fractures.

We evaluated the one-year results of treatment for distal radius fractures. The group evaluated comprised 49 conservatively treated fractures, 78 fractures treated by angle-stable locking plates with either rigid direction or multidirectional screws and 35 fractures in which Targon DR intramedullary nails or X-screws were used. Some radiographic parameters were better in the patients treated by intramedullary osteosynthesis, while some of the functional outcomes were better in the fractures treated by plate osteosynthesis although this method was indicated in patients with significantly more complicated fractures.

A mathematical model was used to simulate distal radius fractures, type C1 and type C2. The stability of both locking plate and intramedullary osteosyntheses was evaluated with the wrist joint loaded: by compressive stress applied in the direction of the forearm axis and by forces acting in the direction of radial deviation and ulnar deviation, volar and dorsal flexion and forearm pronation and supination. The mathematical modeling showed a generally greater stability of intramedullary osteosynthesis.

The discrepancy between the results of patient clinical evaluation and those of mathematical simulation can most probably be explained by the weakening of primary fragment stability caused by screw insertion in complicated fractures or osteoporotic bone.