Trends in Post-traumatic Wrist Reconstruction Since the Advent of Volar Plate Fixation of Distal Radius Fractures: An American Board of Orthopaedic Surgery Database Study

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INTRODUCTION: Volar plating has transformed the treatment of distal radius fractures. Prior to volar plating, casts, external fixation, and Kirschner wires were the main treatment methods for distal radius fractures. Now, the use of volar plates for the maintenance of reductions is more dependable. In our subjective experience, post-traumatic reconstructions are much less frequently needed than they were prior to volar plate fixation. The authors hypothesize that the use of volar locking plate fixation has led to improvements in patient outcomes and therefore decreases in procedures such as ulnar shortening osteotomy and wrist arthrodesis in patients with distal radius fractures.

METHODS: The American Board of Orthopaedic Surgery (ABOS) Part II Oral Examination Case List Database was queried by CPT code to identify treatments of distal radius fractures before and after the implementation of volar plate fixation. Treatments included wrist arthrodesis, wrist osteoplasty, wrist osteotomy, and open reduction internal fixation (ORIF). Patients were separated into early (1998-2000) and late (2020-2022) cohorts, before and after the implementation of volar locked plating. Procedural frequency and complication rates were recorded. T-tests and chi-squared tests were utilized to analyze data, with $p < 0.05$ considered significant.

RESULTS:

The early cohort had 969 patients while the late cohort had 10,281 patients. 95.5% of all patients in the late cohort underwent ORIF versus just 0.1% in the early cohort ($p<0.0001$). A significantly higher percentage of the following operations were performed in the early cohort versus the late cohort: wrist arthrodesis (65.1% versus 2.8%, p,0.0001), wrist osteoplasty (14.1% versus 0.9%, $p<0.0001$), wrist osteotomy (14.1% versus 1.4%, $p<0.0001$), and wrist arthroplasty (6.5% versus 0.3%, $p<0.0001$). These significant changes in the proportion of procedures performed was observed across subspecialties both individually and overall. By the late cohort, ORIF was associated with lower rates of overall complications compared to non-ORIF procedures (20.2% versus 26.4%).

DISCUSSION AND CONCLUSION: Volar locking plate fixation has transformed the treatment of distal radius fractures. While patient outcomes tend to be reliable with volar plating, complex distal radius reconstruction is significantly less common than it used to be. This substantial change in every hand surgeon's practice should be appropriately reflected on expected case numbers for hand surgery fellowships.

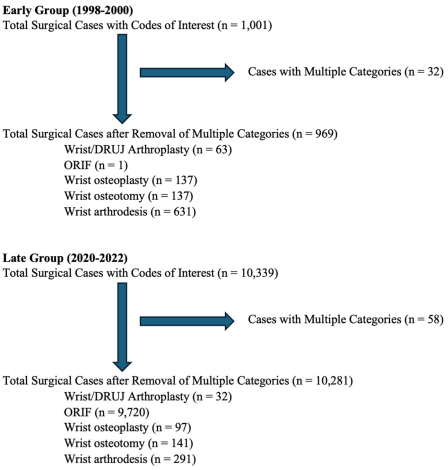

Figure 1: Flow chart detailing the inclusion and exclusion of surgical cases in each of the relevant cohorts (early and late).

Table 1: Number of Cases During Early vs Late Period

	Wrist Arthrodesis	Wrist Osteoplasty	Wrist Osteotomy	Wrist/DRUJ Arthroplasty	ORIF
Early Period (1998-2000), n = 969	631 (65.12%)	137 (14.14%)	137 (14.14%)	63 (6.50%)	1 (0.10%)
Late Period (2020-2022), n =10,281	291 (2.83%)	97 (0.94%)	141 (1.37%)	32 (0.31%)	9,720 (94.54%)
P value	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**	**<0.0001**

Table 1: The number of cases in each of the relevant categories for both the early and late periods.