



# The Incidence of FPL Rupture in Distal Radius Fractures Treated with Volar Locking Plate Fixation



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## Background

Volar locked plating has become the mainstay of treatment for unstable distal radius fractures<sup>(1)</sup>. Rupture of the flexor pollicis longus (FPL) is a noted complication of this surgical technique, resulting in functional impairment and difficulty performing simple everyday tasks<sup>(2)</sup>.

The Soong grading system was developed to assess for a patient's likelihood of FPL rupture based on how distally the volar plate was placed on the radius and how prominent the plate is with respect to the volar lip of the radius<sup>(3,4)</sup>. Recent work has shown Soong grade to be associated with the need for plate removal<sup>(5)</sup>. However, there has yet to be an assessment of this grading system for a large patient population or with varied plate designs.

## Null Hypothesis

- There is no difference in the rate of post-ORIF FPL rupture between Soong grades
- There is no difference in FPL rupture rate when comparing plate designs or surgeon fellowship training

## Methods

Soong grades were calculated based on immediate post-op radiographs where the critical watershed line was drawn in parallel to the shaft of the radius.

Demographic data was compiled including age and gender. Surgeon's training, days to fixation, length of follow-up and plate designer were also included for analyses.

Statistical analysis composed of two sample T, chi-square, Wilcoxon rank sum, Fischer exact tests and linear regression modeling between complications and non-complication groups with Bonferroni corrections. Odds ratios used to delineate significance between significant variables.

## Methods

### Database Identification

- CPT code match (25607, 25608, 25609)
- 750 patient charts

### Inclusions and exclusions

- Inclusions: ORIF between 2011-2015
- Exclusions: lack of VLP fixation, lack of post-operation follow-up, lack of available imaging and use of external fixation

### Complication and No Complications

- Identify any complications in post-op notes
- Note must relate diagnosis of condition and relate such to ORIF

## Results

750 patients were identified and 522 were included in this study. There were no FPL ruptures. Complications (including stiffness, ELP rupture, CPS, etc.) were noted in 44 patients.



FIGURE 1: Soong grading on lateral radiographs. (A) Soong grade 0, (B) Soong grade 1, (C) Soong grade 2.

	Flexor tenosynovitis n=12	Some other complication n=44	p-value
Age, mean ± SD	56.89 ± 13.00	50.94 ± 14.97	0.3181
Female, n(%)	10(83.3%)	27(61.4%)	0.1888
Soong Grade, n(%)			0.0733
0	0(0.0%)	5(11.4%)	
1	8(66.7%)	35(79.6%)	
2	4(33.3%)	4(9.1%)	
Plate type			0.0098*
Synthes	1(8.3%)	16(36.4%)	
Stryker	5(41.7%)	20(45.5%)	
Acu-med	6(50.0%)	4(9.1%)	
Tri-Med, Smith&Nephew, Medartis	0(0.0%)	4(9.1%)	
Surgeon Training			0.0428*
Hand	11(91.7%)	26(59.1%)	
Trauma	1(8.3%)	18(40.9%)	

## Results

- Surgeon training and plate type, when modeled together, were not associated with flexor tenosynovitis
- Flexor tenosynovitis as a % of total complications was significantly higher in patients treated by hand fellowship trained , OR 0.42 hand vs 0.06 trauma (95%CI 0.90, 64.31)
- Flexor tenosynovitis as a % of total complications was significantly higher in DRF treated with Stryker plates, OR 1.5 Stryker vs 0.15 in other plate types (95%CI 2.17, 46.12)

## Discussion

This study identified no FPL ruptures in a series of over 500 patients. However, flexor tenosynovitis was noted in 12 individuals. In contrast to other studies, Soong grades were not significantly different between any of the groups.

Overall complications were not significantly different by plate design nor fellowship training. However, higher rates of flexor tenosynovitis of the total complications were found in patients with Stryker plates and those treated by hand fellowship trained surgeon. Contemporary plate design attempts to prevent contact between the FPL and the plate.

The association between hand fellowship training and flexor tenosynovitis could be due to increased awareness of this complication and early hardware removal and/or higher incidence of intra-articular fractures treated by hand surgeons, requiring more distal plate placement.

## Conclusions

- No FPL ruptures occurred in the 522 patients assessed
- Soong grades were not associated with complications or flexor tenosynovitis
- Plate design/manufacturer and hand-fellowship training did not affect overall rates of flexor tenosynovitis.

## References

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