

The Role of Proximal Locking Fixation in Distal Radius Fractures

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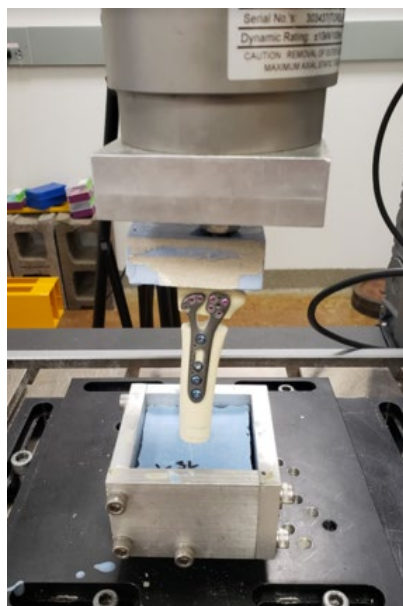
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INTRODUCTION

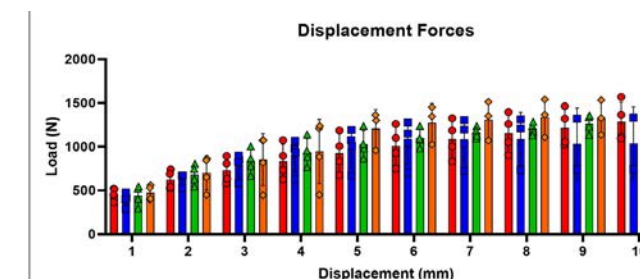
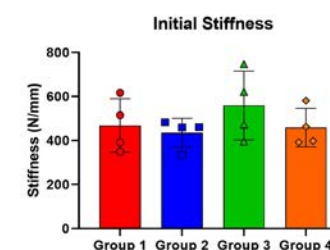
- Displaced, unstable distal radius fractures are often managed with volar locked plating
- Distal locking fixation is well established to support the articular surface
- Proximal locking screw fixation may increase construct stiffness
- The effect of proximal locking fixation has not been clearly established, and its use may be associated with increased construct cost

METHODS

- Comminuted metaphyseal distal radius model
- Volar locking plate with 4 configurations of diaphyseal screws:
 - All cortical screws
 - All locking screws
 - Distal locking screw
 - Proximal locking screw
- Outcomes tested
 - Initial stiffness
 - Load to displacement from 1-10 mm
 - Load to failure
- Testing protocol: cyclic and load to failure



Results



Conclusion

- Our study did not demonstrate biomechanical superiority with use of proximal locking screws in a synthetic bone model.
- Mode of failure appeared to be different between LS and NLS configurations, with implant failure more commonly seen in LS configurations.
- Further study is warranted to evaluate if a clinical benefit exists with proximal locking screws in volar plating of distal radius fractures. There were no statistically significant differences found in initial construct stiffness. There were no differences found in motion amplitude between groups with cyclic loading at any force magnitude. There was no significant difference found in load to failure between groups. No failure of distal fixation was observed. In the all-NLS configuration, failure consistently occurred via toggling of the proximal screws allowing for proximal plate migration, whereas LS breakage or locking mechanism failure was seen in the LS configurations.