

### **Proximal Interphalangeal Joint Congruity: A Biomechanical Study**

**Purpose:** Surgical approaches to the proximal interphalangeal (PIP) joint often require disruption of soft tissue stabilizers. Additionally, PIP joint injuries frequently result in traumatic soft tissue disruption. This study evaluates the necessity of repairing soft tissue stabilizers by assessing their role in maintaining native joint congruity. **Methods:** Eight specimens were secured into a testing frame to evaluate congruity at 0° and 30° flexion when loaded with 2N of valgus force. This was performed in the native joint and after sequential sectioning of the surrounding ligaments in order: volar plate (VP), radial collateral ligament, ulnar collateral ligament. The skin flap over the joint was sutured with the ligaments unrepaired and the load was reapplied. Radiographs were taken after each load and used to measure the joint line convergence angle (JLCA). Changes in congruity were compared after ligaments were sectioned and between degree of flexion. **Results:** Mean JLCA increased in both degrees of flexion after ligaments were sectioned but was only significantly different from the native joint after the VP was disrupted along with one collateral ligament (CL). Joint congruity improved following repair of the skin flap in both degrees of flexion but was not significant. Joints were more congruent in 30° flexion for all subgroups, but none were significantly different compared to 0° flexion. **Conclusions:** Disruption of the VP is insufficient to significantly alter PIP joint congruity. While sectioning of both the VP and CLs resulted in a statistically significant change in joint congruity, mean JLCA demonstrated changes of minor clinical significance. The osseous anatomy of the phalanges imparts inherent stability that maintains a congruent joint despite loss of the soft tissue stabilizers.

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