

### The Effect of Interosseous Ligament Integrity on Radial Head Stability

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**Purpose:** Radial head instability in complex forearm injuries is multifactorial and can be due to radius/ulna shaft abnormality or ligamentous instability. The purpose of our study is to understand the effect of the interosseous ligament on radial head stability. The interosseous ligament is composed of the proximal, central and distal band. We hypothesize that the proximal band is responsible for radial head stability. Radial head displacement anteriorly is mainly due to the pull of the biceps tendon on the bicipital tuberosity.

**Methods:** Using a motion capture system, we marked multiple points along the forearm to allow us to measure radial head anterior displacement with sequential sectioning of the interosseous ligament. We first sectioned the annular ligament followed by the proximal band, the central and the distal band. We then loaded the radial head by pulling in the line of the biceps muscle on the biceps tendon. We used a mechanical jig to pull on the biceps tendon continuously until we reached terminal displacement or 20 N. We measured the amount of anterior displacement after each portion of the ligament was divided.

**Results:** We found the annular ligament sectioning lead to a 2 mm ( $\pm 0.8$  mm) anterior translation of the radial head in relation to the capitellum when the biceps was loaded. With sectioning of the proximal band of the interosseous ligament, the radial head did not dislocate, as we had anticipated. There was greater instability as the radial head under load had 3 mm ( $\pm 1.2$  mm) anterior displacement in relation to the capitellum. When sectioning the central band, the radial head completely dislocated anterior in relation to the capitellum. When the proximal, central and distal bands were sectioned, the entire forearm became unstable and the radius displaced grossly anteriorly as there was no further soft-tissue tether on the radius.

**Conclusion:** The interosseous ligament is a key player in radial head stability. Anterior radial head instability in the setting of anatomical fixation of fracture may be due to interosseous ligament injury. In the setting of radial head instability where the radial head completely dislocated anteriorly, the proximal and central bands of the interosseous ligament may be torn and reconstruction of this soft-tissue stabilizer may lead to radial head stability.



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