

Session/Poster#

Presenter

B35

Samuel Gedailovich

College of Medicine Student

Advisor(s): Dr. Ishaq Ibrahim, Orthopedic Surgery

The Medial and Lateral Forearm Fascia Contribute to Overhead Elbow Extension in Displaced Olecranon Fractures: A Biomechanical Study

Intro: In nonoperative management of displaced olecranon fractures, patients are able to maintain overhead extension despite a persistent nonunion. It has been hypothesized that this is feasible due to an intact lateral cubital retinaculum. The purpose of this biomechanical study was to determine the contribution of the medial and lateral cubital retinacula to overhead extension in the setting of a displaced olecranon fracture.

Methods: Eight fresh-frozen cadaveric upper extremity specimens were used. The triceps muscle was loaded through a pulley system operated by an Instron 8874 Biaxial Servohydraulic Fatigue Testing System (Norwood, MA, USA) at a rate of 10 mm/sec to simulate overhead elbow extension. Each specimen was tested in four states: 1. Native with an olecranon intact; 2. A transverse olecranon fracture; 3. Transection of one cubital retinaculum (medial or lateral); 4. Transection of both medial and lateral cubital retinacula.

Results: Elbow extension was noted in each specimen for trials one through three. Only when both the lateral and medial fascia were transected was elbow extension not achieved. There was no significant difference in the force required to generate extension in the first three trials ($p = 0.99$). There was no significant difference in the change in maximal force required to achieve extension between the specimens with the medial side transected only compared to those with the lateral side transected only ($p = 0.07$).

Discussion: In the setting of an olecranon fracture, this biomechanical study suggests that if either the lateral or medial cubital retinaculum remains in continuity with the distal ulna, active overhead extension can be maintained. This may explain positive clinical outcomes of nonoperative management of displaced olecranon fractures in the elderly patient population. Determining the integrity of the fascial structures preoperatively may help select candidates for nonoperative treatment of displaced olecranon fractures.