

Ulnar nerve strain during throwing motion and ulnar nerve transfer which is suitable for throwing motion

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It is well known that the excessive throwing activities occasionally cause cubital tunnel syndrome in baseball players. Friction and tension of the ulnar nerve are considered to be the cause of this nerve lesion. In this presentation, we demonstrate the results of ulnar nerve strain at the cubital tunnel during throwing motion and ulnar nerve behavior after various ulnar nerve transfer surgeries.

Experiment 1: Using 7 trans-thoracic specimens, the ulnar nerve at the cubital tunnel was observed during 4 throwing phases (stance, wind-up, cock-up, early acceleration) and the nerve strain was measured at each elbow flexion (45, 90, 120 degrees, and full flexion).

Experiment 2: Using 7 trans-thoracic specimens, based on magnified photographic images, ulnar nerve behavior was observed with grading method (dislocation: none, slight, moderate, complete; and tension: loose, straight, mild, moderate and/or greater) before and after ulnar nerve transfer surgeries (Osborne, anterior subcutaneous transfer, and ulnar groove deepening).

Results of experiment 1 demonstrated that elbow flexion greater than 120 degrees caused greater than 10% strain of the ulnar nerve in acceleration phase. Therefore, before surgery, moderate and/or greater tension was proved to be compatible with greater than 10% strain of the ulnar nerve. In experiment 2, Osborne surgery with 120 degree elbow flexion demonstrated moderate and complete dislocation in 6 out of 7 specimens during acceleration phase. Anterior subcutaneous transfer demonstrated mild tension in extended or 45 degree elbow flexion during acceleration phase. Ulnar groove deepening surgery demonstrated stable nerve in the deep groove with moderate tension during 120 degree elbow flexion.

Based on these results, acceleration phase of the throwing motion is proved to cause a certain amount of ulnar nerve tension or irritation even after nerve transfer surgeries.