Manipulation Under Anesthesia as a Treatment of Posttraumatic Elbow Stiffness

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Purpose: Loss of motion is common after traumatic injury to the elbow. There are limited data on the use of forcible passive stretching under anesthesia to improve motion in the posttraumatic elbow. Some authors suggest forcible manipulation may cause a higher rate of complications including ectopic bone formation, ulnar neuritis, and arthrofibrosis. This study is a review of forcible manipulation under anesthesia for patients with posttraumatic elbow stiffness. We hypothesize that manipulation under anesthesia for the treatment of posttraumatic elbow stiffness will significantly increase elbow flexion and extension arc without a high rate of complications.

Methods: A retrospective chart and radiographic review was performed of patients at a single institution who underwent isolated elbow manipulation under anesthesia in treatment of posttraumatic elbow stiffness from 2002 to 2011. The review included an analysis of patient demographics, initial injury data, timing of injury to manipulation, range of motion, previous nonoperative therapy, fracture union at time of manipulation, rate of complications, and additional reoperations. Manipulation was recommended in patients who failed to see adequate improvement in range of motion after elbow trauma. Manipulation involves cautious, but firm, alternating forcible flexion and extension, minimizing the length of the lever arm over which the force is applied.

Results: 46 patients were included in the review, with an average follow-up of 583 days (range, 76-1623). There were 20 open fractures (43.5%), 8 of which required soft-tissue coverage. Average premanipulation flexion arc was 56.6° and improved significantly at final follow-up to an average flexion arc of 83.7° ($P < 0.001$). Five patients developed clinically significant heterotopic ossification, two patients later required cubital tunnel decompression, and 13 patients underwent additional procedures to treat arthrofibrosis. There was no reported loss of fixation. The only acute complication of manipulation was minor tearing of a skin graft in one patient. Post hoc analysis of data identified two distinct subgroups: patients manipulated within 3 months of their final elbow surgery (G_1) and patients manipulated after 3 months of their final elbow surgery (G_2). G_1 had an average improvement in flexion arc of 38.3°; G_2 had an average improvement of 3.1°. This increase in range of motion from pre-manipulation to final follow-up was a significant improvement for G_1 ($P < 0.001$), but not for G_2. The difference in improvement between G_1 and G_2 was statistically significant in favor of the early manipulation group ($P < 0.001$).

Conclusion: Elbow manipulation under anesthesia within 3 months of final elbow surgery is an effective means of improving flexion arc for patients with posttraumatic elbow stiffness. Elbow manipulation after 3 months does not appear to be effective at improving flexion arc.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.