

Outcomes following Surgical vs. Nonsurgical Treatment of Completely Displaced Midshaft Clavicle Fractures in Adolescent Baseball Players and other Overhead Athletes

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INTRODUCTION:

In contrast to noted studies in adult patients, recent investigations of completely displaced midshaft clavicle fractures in large populations of adolescents has demonstrated equivalent patient-reported outcomes (PROs) and fewer complications and secondary surgeries following nonsurgical treatment, when compared to surgical treatment. However, specific adolescent subpopulations, such as throwers, who may have unique relative benefits from surgical intervention, remain under-investigated. The aim of the current study was therefore to assess the complications and PROs in baseball players and other overhead athletes, with specific comparisons of dominant vs. nondominant shoulders and surgical vs. nonsurgical treatment.

METHODS: Prospectively collected data from all 10-18 year-old patients with completely displaced midshaft clavicle fractures treated at 8 participating institutions from 2013-2022 was filtered for overhead athletes, including those participating in baseball, softball, water polo, lacrosse, racquet sports, and football quarterbacks. These athletes were further divided into operative (ORIF) or nonoperative (NonOp) treatment cohorts. The outcomes and complications were analyzed in comparative fashion, as were dominant versus nondominant laterality. Further variables analyzed included: demographics and fracture characteristics, and PROs (ASES, QuickDASH, Marx Shoulder activity, EQ5D, and EQ-VAS).

RESULTS: Out of a total of 788 completely displaced adolescent clavicle fractures, there were 238 overhead athletes identified (30.2%), 123 (51.7%) of whom were baseball players (15.6% overall). Among the baseball players, 46 fractures (37.4%) were on the dominant shoulder, while 77 (62.6%) were on the nondominant shoulder. Of the 46 dominant shoulder fractures in baseball players, 18 (39.1%) were in the ORIF cohort, compared to 28 (60.9%) in the NonOp cohort. The ORIF cohort had patients that were older, with fractures that demonstrated more superior displacement, shortening, and comminution. When complications, secondary surgeries, or PROs between these treatment groups were compared, the only difference was a superior mean QuickDASH score in the NonOp cohort ($p=0.01$), a finding that was replicated when treatment groups in the dominant shoulder of all overhead athletes were compared as well ($p=0.04$). When dominant vs. nondominant shoulders were analyzed among baseball players, both within ORIF and NonOp cohorts, there were no differences in complications, secondary surgeries, or PROs between sides. Complications in the dominant side of all overhead athletes were rare, including delayed union (2%), symptomatic malunion (1%), and refracture (4%), and were not statistically different between ORIF and NonOp cohorts. Only 1 case of nonunion (on the nondominant side of a baseball player) was identified, despite the majority of patients (77%) undergoing nonsurgical treatment.

DISCUSSION AND CONCLUSION: Overhead throwers, including baseball players, who sustained completely displaced midshaft clavicle fractures appear to have equivalent, or perhaps superior results from nonsurgical treatment, when compared to surgical fixation. Outcomes appear similar between the dominant and nondominant side, regardless of treatment approach. Unlike completely displaced midshaft clavicle fractures in adult patients, similar fractures in adolescent overhead athletes are associated with low rates of complications, such as nonunion and symptomatic malunion, regardless of treatment approach.

