Medial Epicondyle Apophyseal Avulsion Fractures in Youth Throwers: A Severe Variant of Little League Elbow (132)

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Objectives: Medial epicondyle apophyseal avulsion fractures sustained during throwing represent an understudied, severe variant of medial epicondyle apophysitis, or 'Little League elbow'. The current study sought to characterize presenting features, treatment options, and clinical results of a large cohort of pre-adolescent and adolescent patients who presented with these fractures.

Methods: Skeletally immature athletes with medial epicondyle apophyseal avulsion fractures sustained during throwing from 2003-2017 at a tertiary-care pediatric referral center were identified. Exclusion criteria were fractures sustained during non-throwing activity or prior elbow fracture. Medical records and radiographic images were reviewed for study variables. Treatment decisions were made independently by fellowship-trained pediatric orthopaedic surgeons or sports medicine physicians on a case-by-case basis. Patients treated with open reduction and internal fixation (ORIF) were compared to those treated non-operatively, and all fracture patients were compared to a larger control group of patients diagnosed with medial epicondyle apophysitis/Little League elbow with no fracture.

Results: During the study period, a total of 317 patients were diagnosed with Little League elbow due to medial epicondyle apophyseal overuse injury, 50 of whom (16%) sustained a discrete, radiographically confirmed epicondyle fracture sustained during a single throw. Median age of the fracture cohort at presentation was 13.1 years (range 8 years – 16 years). Forty-nine fracture patients (98%) were male baseball pitchers and one (2%) was a male football quarterback. Fracture patients had significantly higher median BMI (21.3 kg/m² vs. 19.2kg/m², $p=0.004$) than the apophysitis control group, but there was no significant difference in age. Of the 37 patients with documentation regarding pre-injury symptoms, 31 patients (84%) described pre-existing medial elbow pain prior to their acute injury, while 6 (16%) denied pain prior to the inciting throw. Of the 12 patients (24%) with documented shoulder exams at presentation, 5 (42%) demonstrated glenohumeral internal rotation deficit (GIRD). Twenty-three patients (46%) were treated with ORIF (22 single screw fixation; 1 suture anchor fixation), while 27 (54%) were treated non-operatively. Median fracture displacement was significantly greater in operative patients than non-operative patients (5.0mm vs. 3.0mm, $p<.001$), with all 'minimally displaced' (<4mm) fractures undergoing non-operative treatment (Figure 1). Multivariable analysis determined that for each additional mm of displacement, the odds of surgical intervention increased by 6.4 times (OR=6.36; 95% CI=1.83-22.07; $p=.004$), when controlling for age and BMI. All patients returned to their throwing sport (RTS) at a median of 12.8 weeks post-diagnosis, but 13 (26%) developed recurrent elbow pain, with no significant difference in in RTS time or recurrence rate between treatment cohorts. Nine of twenty-two (41%) screw ORIF patients underwent secondary implant removal, with no significant difference in this rate between those with or without a washer.

Conclusions: Medial epicondyle apophyseal avulsion fractures in youth throwers represent a severe variant of Little League elbow, constituting approximately 16% of cases within the condition's spectrum. These fractures may be effectively treated with either non-operative measures, particularly minimally displaced fractures <4mm, or ORIF, though >40% of operative patients may require implant removal. A large majority of patients reported medial elbow pain prior to fracture, suggesting this severe presentation of Little League elbow may be preventable.

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