PROGRESSIVE ELBOW MRI ABNORMALITIES IN LITTLE LEAGUE BASEBALL PLAYERS ARE COMMON: A 3-YEAR LONGITUDINAL EVALUATION

Joshua Holt, MD1, Philip Stearns, MSN, CPNP2, Tracey Bastrom, MA3, Morgan Dennis, BS4, Jerry Dwek, MD5, Andrew Pennock, MD6

1Rady Children's Hospital, San Diego, CA, USA, 2Rady Children's Hospital, San Diego, USA, 3Rady Children's Hospital, San Diego, USA, 4Rady Children's Hospital, San Diego, San Diego, CA, USA, 5Rady Children's Hospital, San Diego, USA, 6Rady Children's Hospital, Rancho Santa Fe, CA, USA

Background
Significant effort has been made by multiple organizations including Little League Baseball, USA Baseball, Major League Baseball, and the American Academy of Orthopaedic Surgeons to minimize the rate of shoulder and elbow injury among Little League Baseball players. Despite this effort, recent MRI studies have shown high rates of elbow pathology in this athletic population. The purpose of the current study was to track a cohort of Little League baseball players over three years with serial examinations and MRI to determine the natural history, progression, and risk factors of previously identified elbow pathology.

Methods
A prospective study of Little League players who were 12 to 15 years of age was performed. All players had preseason and postseason elbow MRI performed three years prior to the current study. Players underwent repeat bilateral elbow MRI, physical examination of bilateral shoulders and elbows, a detailed assessment of throwing history, and completed a questionnaire addressing playing history and current playing status, and any arm pain. The MRI scans were read by a blinded musculoskeletal radiologist and subsequently compared to players’ prior MRI to assess for progression or resolution of previously identified pathology. Identified MRI pathology was categorized as persistent/mild, progressive/severe, or improved/resolved (Figure 1).

Results
All 26 players who participated in the previous single season study returned for a 3-year longitudinal assessment, representing a 100% follow-up rate. Fifteen players (58%) had dominant arm MRI pathology. 80% of MRI findings (12/15 players) were determined to be new or progressive lesions. Players with post-season MRI pathology were significantly more likely to have MRI pathology at 3-years follow-up (p<0.05). Six of the 14 players (43%) with previously normal MRI had new pathology. Year-round play was a significant predictor of tenderness to elbow palpation (p=0.027) and positive MRI findings at 3-years (p=0.047). Moderate/persistent and severe/progressive MRI findings were more often seen in players who continued to play baseball, play pitcher or catcher, and play year-round baseball (Figure 2). Dominant shoulder internal rotation was significantly less than non-dominant shoulder internal rotation amongst all players (60.3° compared with 71.2°, p=0.002). Dominant shoulder external rotation was significantly increased in players who continued to play baseball when compared with those no longer playing (109.1° versus 99.3°, p=0.012), in players playing pitcher or catcher when compared with non-pitchers/catchers (111.4° versus 100.3°, p=0.005), and in players who played year-round baseball when compared to those playing < 8 months per year (109.0° versus 100.2°, p=0.026).

Conclusion/Significance
Dominant elbow MRI abnormalities are common in asymptomatic Little League baseball players. Three-year longitudinal evaluation suggests that these MRI findings commonly progress, especially amongst players who continue to play baseball. Year-round play appears to impart the most notable risk to young players, with results of the current study showing increased rates of physical exam abnormalities and progressive MRI pathology. Further guidelines addressing year-round play in Little League Baseball should be established.
