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Micro-Coil Mri Scan Findings in Ulnar Collateral Ligament Condition in Professional Baseball Players

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Summary:
Recently, ulnar collateral ligament (UCL) reconstruction procedure has become increasingly more common in major league baseball (MLB) players. The purpose of our study was to evaluate UCL injury using micro-coil MRI (MMRI) scan in professional baseball pitchers. The 11 of 42 players(26%) had UCL injury. but, 6 players(55%) players were still able to play baseball on the premier team.

Abstract:

Introduction

Recently, ulnar collateral ligament (UCL) reconstruction has become increasingly more common in major league baseball (MLB) players. The reported rates of competition return after UCL reconstruction were 66-98%. However, they underwent UCL reconstruction because abnormalities of UCL were found on MRI. We have developed novel MRI techniques using a micro-coil to more clearly visualize UCL and found that even asymptomatic elbows had UCL abnormalities. It is still unclear if professional pitchers with higher grade UCL abnormalities can play baseball with high performance.

Purpose

The purpose of our study was to evaluate UCL abnormalities using micro-coil MRI (MMRI) scan in professional baseball pitchers and to investigate their performance by severity of UCL abnormalities.

Method

From 2014 to 2017, 42 professional baseball pitchers visited our institute for medical check after a season including MMR. They were all males with a mean age of 26 years (range, 19-36). Twenty-eight pitchers were right-handed, and 14 were left-handed.
UCL condition on MMRI was graded into 4 grades: Grade 1, intact ligament; grade 2, intermediate signal intensity in the ligament; grade 3, a high signal intensity in the ligament or partial tear; grade 4, full-thickness tear or no ligament tissue. We investigated their play level after the medical check. We also compared performance metrics between pitchers with lower grade (grade 1 or 2) and higher grade (grade 3 or 4) UCL, including the numbers of pitched innings and games in a season and maximum pitch speed.

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Results

Ten elbows were diagnosed as grade 1, 21 were grade 2, 10 were grade 3 and 1 was grade 4. There were no statistically significant differences in players' experience, pitch speed, and the number of pitched innings or games between pitchers with lower and higher grade UCL. Six players (54%) with grade3 or 4 UCL were still able to play baseball on top teams. Three pitchers with grade 3 UCL had retired. The reasons were elbow pain due to osteoarthritis, skill deterioration, and private reasons. One player with skill deterioration was working as a batting pitcher. Two players with grade 2 UCL injured their elbows with higher grade UCL injuries after the initial medical check. One player had platelet-rich plasma treatment, and another player had UCL reconstruction.

Conclusions

We evaluated UCL condition using MMRI for professional baseball pitchers, and 12 pitchers (29%) had higher grade UCL abnormalities. Six pitchers (54%) with grade 3 or 4 UCL were able to play baseball in top teams. This finding suggests that higher grade UCL injury on MRI does not necessarily mean surgical indication for UCL reconstruction.