The Incidence of Osteochondritis Dissecans of the Capitellum in School-Age Baseball Players Decreased after the In-Game Pitch Count Limit per Pitcher: Prospective 5-Year Cohort Study

Rikuto Yoshimizu, Junsuke Nakase[1], Masahiro Kosaka[2], Yasushi Takata[3], Kengo Shimozaki[4], Mitsuhiro Kimura[2], Tomoyuki Kanayama, YUSUKE YANATORI[2], Hiroyuki Tsuchiya[2]
[1]Junsuke Nakase, MD Phd, Department of Orthopaedic, [2]Kanazawa University, [3]NHO Kanazwa Medical Center, [4]Kanazawa University Hospital

INTRODUCTION:
Ultrasound-based physical examinations are widespread among school-aged baseball players in Japan. These examinations are aimed at detecting early osteochondritis dissecans (OCD) of the capitellum not visible on radiography. According to a previous study using ultrasound, it occurs more in baseball players aged 10–12 years, with an incidence of 3%–5% in all players.
In Japan, guidelines for preventing pitching injuries in school-age baseball players have been recommended following the Major League Baseball (MLB)'s "Pitch Smart" although there were no strict limits on the number of pitches a pitcher could throw during a game. In 2019, new guidelines were added to limit the number of a player's pitches in a game to a maximum of 70 pitches per day, and their effectiveness in preventing injury is under investigation.
With the introduction of the pitch count limit, more players are expected to play in multiple positions, including the pitcher. The catcher is a position with the most pitches. Although MLB's "Pitch Smart" states that players should not be involved in dual roles as both pitchers and catchers, it is challenging to comply for a team with few members. Limited data is available on investigating the safety of dual roles within the pitch count limit.
This study aimed to investigate whether pitch limits decrease the incidence of OCD development in school-age baseball pitchers and catchers. Second, we investigated changes in the number of pitchers, catchers, or both before and after the pitch limit and evaluated the relationship between these changes and the incidence of OCD development.
We hypothesized that the pitch count limit would decrease the incidence of OCD in pitchers and catchers. We also considered that the number of dual-role players as both pitchers and catchers would increase after the introduction of the pitch count limit and that these players would develop OCD more frequently.
METHODS:
A total of 1,110 baseball pitchers and catchers aged 10–12 years who underwent ultrasound examinations between 2017 and 2021 were included in the study. All players were given a questionnaire about their main and sub-positions and players who were either pitchers, catchers, or both. Players with a history of OCD were not eligible for examination.
In 2019, the in-game pitch count limit was set at a maximum of 70 pitches per day and strictly monitored by each team's scorer.
All players underwent an ultrasound examination of the throwing-side elbow. Ultrasound examinations were performed by five orthopaedic surgeons who performed the first check of all players. For players with suspected OCD, a second check was performed by two other orthopaedic surgeons for final determination. Ishizaki's classification was used for all examinations, and an anterior and posterior view image scan was performed.
The primary outcome was the detection rate of OCD in pitchers, catchers, and both before and after the introduction of the pitch-count limit. The secondary outcome involved changes in the number of players at each position before and after the introduction of the pitch count limit to investigate its association with the detection rate of OCD. All statistical examinations were performed using the chi-square test, and p-values less than 0.05 were considered statistically significant.
RESULTS:
The number of players examined before and after the introduction of the pitch count limit was 412 and 698, respectively. The OCD detection rates before and after the introduction of the pitch count limit were 8.5% and 2.6%, respectively; 5.9% decreased after the introduction of the pitch count limit ($p<0.01$) (Table 1).
The percentage of players who played the dual roles of pitcher and catcher increased significantly from 16.3% to 21.2% before and after the introduction of the pitch count limit ($p=0.04$) (Table 2). The OCD detection rates in players with dual roles before and after the introduction of pitch limits were 18.3% and 2.7%, respectively, and 15.6% decreased after the introduction of pitch limits ($p<0.01$) (Table 3).
DISCUSSION AND CONCLUSION:
The incidence of OCD of the capitellum in school-age baseball pitchers and catchers decreased by 5.9% when the in-game pitch count was limited per pitcher. The number of players who played the dual role of pitcher and catcher increased by 4.9% after the introduction of the in-game pitch count limit, whereas the incidence of OCD development decreased by 15.6 %.

	Before	After	p-value
Total players	412	698	
OCD players	35 (8.5%)	18 (2.6%)	**p<0.01**

Table 1
OCD detection rates of the total players before and after the introduction of the pitch count limit

	Before	After	p-value
Total players	412	698	
Pitcher	255 (61.9%)	444 (63.6%)	p=0.59
Catcher	90 (21.8%)	106 (15.2%)	**p<0.01**
Pitcher and Catcher	67 (16.3%)	148 (21.2%)	**p=0.04**

Table 2
Changes in the number of players who are pitchers, catchers, or both before and after the pitch count limit.

	Before	After	p-value
Pitcher	17 / 255 (6.7%)	11 / 444 (2.5%)	**p<0.01**
Catcher	7 / 90 (7.8%)	3 / 106 (2.8%)	p=0.12
Pitcher and Catcher	11 / 67 (18.3%)	4 / 148 (2.7%)	**p<0.01**

Table 3
OCD detection rates before and after pitch count limit by position.