Evaluating the Chase Utley Rule

The Association Between a Rule Change and Collision-Related Injuries in Major League Baseball

Joseph E. Tanenbaum,*† MD, PhD, Derrick M. Knapik,‡§ MD, Michael R. Karns,‡§ MD, Michael J. Salata,‡§ MD, Robert J. Gillespie,‡§ MD, and James E. Voos,‡§ MD

Investigation performed at University Hospitals Cleveland Medical Center, Case Western Reserve University, Cleveland, Ohio, USA

Background: Major League Baseball (MLB) adopted a rule change in 2016 to reduce the number of collisions that occur when a player slides into a base. The effect of rule 6.01(j) has not been quantified, and it remains unknown if this rule change has led to improved player safety.

Hypothesis: Rule 6.01(j) would be associated with a reduction in the number of collision-related injuries at second base.

Study Design: Cohort study; Level of evidence, 3.

Methods: Using data from the MLB Health and Injury Tracking System, we quantified the number of collision-related injuries for defensive (ie, fielding) players in the infield at the major and minor league levels between the 2010 and 2019 seasons. We compared the median number of collision-related injuries for defensive players in the infield from before (2010-2015) to after (2016-2019) the implementation of rule 6.01(j) and also calculated the difference in location of the median from the seasons before versus after the rule change. An additional 3 analyses were performed to support or contradict a conclusion that any observed reduction in injuries at the start of the 2016 season was likely caused by the adoption of rule 6.01(j).

Results: The median number of collision-related injuries for defensive players at second base decreased from 58.5 to 37.5 injuries per season after the rule change, which was a 36% decrease (difference in location, 19.5 [95% CI, 5.0 to 31.0]; \(P = .019\)). In contrast, the median number of collision-related injuries at first base decreased by only 14.1%, from 49.5 before to 42.5 after the rule change (difference in location, –9.0 [95% CI, –4.0 to 18.0]; \(P = .16\)), and the median number of collision-related injuries per season at third base was unchanged at 15 per season.

Conclusion: This rule change was associated with a decrease in the number of collision-related injuries, with the largest effect observed at second base, as expected.

Keywords: Major League Baseball; player safety, injury reduction

During an average season in Major League Baseball, >300 injuries are attributed to a player's sliding into a base. Among these slide-related injuries, an estimated 8.2% of injuries ultimately require surgery, with the rate of surgery among MLB players who sustain slide-related injuries estimated at 12.3%. After a slide-related injury, players experience an average of 14.4 days of time lost from play, with those requiring surgery missing an average of 66.5 days. While slide-related injuries among offensive players were investigated in a previous study, injuries to defensive players that may occur as the result of a slide have not been studied.

In an effort to protect both offensive and defensive players, MLB adopted a rule change in 2016 to reduce the number of collisions during slides. Implemented at the start of the 2016 season, rule 6.01(j) states that runners will be called for interference (and declared out) if the runner intentionally initiates contact with the fielder by elevating or kicking his legs, initiates a “roll block,” changes his pathway to the base, or slides past the base when attempting a slide. This rule change was therefore primarily implemented to protect defensive players in the infield (ie, first baseman, second baseman, shortstop, and third baseman). Although Camp et al previously studied the epidemiology of slide-related injuries in MLB, they reviewed only data through the 2015 season, 1 season before the implementation of rule 6.01(j). At the conclusion of their study, the authors suggested that a direction for future work would be to determine the effect of rule 6.01(j).
Rule 6.01(j) likely exerts the greatest effect on the number and severity of injuries for players defending second base, as Camp et al found that the majority (57%) of slide-related injuries occurred when players slid into second base. This hypothesis is further supported by a prior study by Green et al, who found that implementing a similar rule change related to sliding into home plate was associated with a significant reduction in both the number of concussions and time lost from play. Currently, however, the effect of rule 6.01(j) has not been quantified, and it remains unknown if this rule change was associated with improved player safety.

If rule 6.01(j) does not successfully translate into a reduction in the injury prevalence or severity, then it is possible that additional measures are necessary to prevent this injury pattern. The purpose of this investigation was to (1) quantify the number of collision-related injuries to defensive players, (2) evaluate the injury location (first base, second base, third base), and (3) compare the median number of days lost because of an injury from before to after the implementation of rule 6.01(j). We hypothesized that rule 6.01(j) would be associated with a reduction in the number of collision-related injuries at second base, with little to no change in the number of injuries for offensive players sliding into second base. We focused on second base because collisions at second base are often initiated by the base runner to impede double plays by the defense, a potential strategic advantage that does not exist for collisions at other infield bases. This study builds on the work of both Camp et al and Green et al by quantifying the association between the adoption of rule 6.01(j) and collision-related injuries.

METHODS

Data Source

The present study used data from the MLB Health and Injury Tracking System (HITS). Established in 2010, the HITS is a centralized database that includes both an electronic medical record component and a broader injury surveillance mechanism. The HITS includes data on all injuries that occur at the major and minor league levels and is designed to be linked with other player- and game-level data from MLB.

Study Population

All professional baseball players (both major and minor league players) between the 2010 and 2019 seasons were included in the eligible study population. Both pitchers and position players were included, as pitchers can act as base runners (albeit infrequently). Players were enrolled using de-identified injury data from the HITS, and therefore, institutional review board approval was not required for this study.

The following variables were obtained for each slide-related injury from the HITS: year of injury, month within the season when the injury occurred, injury activity (fielding, pitching, sliding, throwing, base running, base running and sliding with feet, other), mechanism of injury (collision, contact with ball, contact with base, contact with bat, contact with ground, contact with player, fall/dive, hit by ball, hit by other equipment, noncontact), injury location on the field (behind home plate, first base area, second base area, third base area, shortstop area), event position (offensive or defensive player), and days missed because of an injury.

Outcome Measures

The primary outcome measure was the number of collision-related injuries for defensive (ie, fielding) players in the infield because rule 6.01(j) was largely driven by concern for collision-related injuries to players defending during slides. An injury was attributed to a collision if the mechanism of injury was listed as “collision” or “contact with player.” Collisions with teammates were excluded. Collision-related injuries were labeled as defensive players based on the event position data or if the injury activity was listed as “fielding.” Injuries were attributed to field locations according to the injury location data from the HITS. Injuries that occurred at home plate were excluded from this analysis because of an additional rule change implemented in 2014 to improve the safety of slides into home plate.

Statistical Analysis

The Wilcoxon rank sum test with continuity correction was used to compare the median number of collision-related injuries for defensive players in the infield in the seasons before (2010-2015) and after (2016-2019) the implementation of rule 6.01(j) at a prespecified alpha level.

*Address correspondence to Joseph E. Tanenbaum, MD, PhD, Case Western Reserve University School of Medicine, 11100 Euclid Avenue, Cleveland, OH 44106, USA (email: joseph.tanenbaum@case.edu) (Twitter: @jttanenbaum).

1Case Western Reserve University School of Medicine, Cleveland, Ohio, USA.

2University Hospitals Cleveland Medical Center, Case Western Reserve University, Cleveland, Ohio, USA.

3University Hospitals Cleveland Medical Center, Case Western Reserve University, Cleveland, Ohio, USA.

4University Hospitals Sports Medicine, Case Western Reserve University, Cleveland, Ohio, USA.

5University Hospitals Sports Medicine, Case Western Reserve University, Cleveland, Ohio, USA.

6University Hospitals Sports Medicine, Case Western Reserve University, Cleveland, Ohio, USA.

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Ethical approval was not sought for the present study.
of .05. We also assessed statistically significant differences using the difference in location of the median from the seasons before rule 6.01(j) to the seasons after its adoption. The difference in location measures the median of the difference between samples of data points from 2 groups. The present study builds on the work of Green et al, who used a similar study design to assess the association between a rule change in 2014 and the number of injuries related to slides into home plate.

An additional 3 analyses were performed to support or contradict a conclusion that any observed reduction in injuries at the start of the 2016 season was likely caused by the adoption of rule 6.01(j). First, we determined the number of collision-related injuries for defensive players at first, second, and third bases, respectively. As above, the Wilcoxon rank sum test with continuity correction was used to compare the median number of collision-related injuries for defensive players at first, second, and third bases, respectively, in the seasons before and after the implementation of rule 6.01(j). Second, we calculated the number of collision-related injuries in the years before the rule change. Finally, we determined the median number of days missed as a result of collision-related injuries in the seasons before and after the rule change. For this final analysis, we used days missed instead of games missed as a surrogate for injury severity. We chose this outcome measure because more detailed data on injury severity were not available in the database. Furthermore, days missed reflects the total days out from team activities (including time in the off-season), whereas games missed would only reflect in-season time missed and may vary according to when in the season an injury occurred. Days missed is also a less subjective outcome measure than time on the injured/disabled list because players must be placed on the injured/disabled list for preset lengths of time whereas days missed reflects actual time out from team activities. Again, the Wilcoxon rank sum test with continuity correction was used to compare these values. All statistical analyses were performed in R Version 3.6.2 (R Core Team, Vienna, Austria).

**RESULTS**

The number of collision-related injuries in each season is shown in Table 1. In the seasons before the rule change (2010-2015), the median number of collision-related injuries was 126 per season. In the seasons after the rule change (2016-2019), the median number of collision-related injuries for defensive players decreased to 112 injuries per season, which was an 11% decrease (difference in location, 23.5 [95% CI, 7.0-52.0]; P = .019) (Table 1).

This reduction was concentrated among injuries at second base and occurred in 2016. In the seasons before the rule change, the median number of collision-related injuries for defensive players at second base was 58.5. In the seasons after the rule change, the median number of collision-related injuries for defensive players at second base decreased to 37.5 injuries, which was a 36% decrease.
In contrast, the median number of collision-related injuries at first base decreased by only 14.1%, from 49.5 before the rule change to 42.5 after (difference in location, 9.0 [95% CI, –4.0 to 18.0]; P = .16), and the median number of collision-related injuries per season at third base was unchanged at 15 per season (Table 1 and Figure 2). The median number of days lost because of collision-related injuries was largely unchanged after the rule change (Table 2).

**DISCUSSION**

Rule 6.01(j) was implemented with the goal of improving player safety, focusing on defensive players at second base. The present study found that rule 6.01(j) was associated with a significant reduction in the number of collision-related injuries to defensive players in professional baseball and likely enhanced player safety. However, the median number of days missed because of these injuries was not statistically significantly different after the implementation of rule 6.01(j).

There are 2 prior studies that have highlighted the role that professional league rule changes may play in improving player safety. First, Green et al. studied a similar rule change that targeted slides into home plate. In their study of MLB and Minor League Baseball players, the authors found that decreasing the number of collisions at home plate was not associated with a meaningful change in the median number of days missed because of those collisions. Second, Ruestow et al. analyzed how a rule change in the National Football League influenced injury rates on kickoff attempts. The authors used data from publicly available injury reports to quantify the number of injuries before and after a change in the starting yard line for kickoffs. The authors found that there was a statistically significant decrease in the incidence of these injuries, and they supported their conclusions by demonstrating that the incidence of injuries on punt attempts (another kick-related play that was not affected by the rule change) was unchanged during the study period.

We performed 3 additional analyses to confirm our principal finding that the number of collision-related injuries in the infield decreased as a consequence of rule 6.01(j). First, it is possible that any observed reduction in the number of collision-related injuries was caused by some unobserved overall change in player safety that was unrelated to rule 6.01(j). If that were true, then we would expect the number of collision-related injuries to decrease at a similar rate across all 3 infield bases (home plate was excluded). Unlike at first or third base, however, collisions at second base can be used to impede double plays, which may confer a strategic advantage that does not exist for collisions at first or third base. The implementation of rule 6.01(j) eliminated that strategic advantage. Therefore, if any observed change in player safety were attributable to rule 6.01(j), then we would expect a disproportionate reduction in the number of collision-related injuries at second base relative to first or third base. To address this hypothesis, we found that the reduction in collision-related injuries was heavily concentrated among defensive plays at second base, where we observed a 36% reduction. In contrast, much smaller (14% reduction at first base and no change at third base) and non—statistically significant reductions in collision-related injuries were observed at first and third bases. Taken together, these findings suggest that the reduction in collision-related injuries is more likely the result of rule 6.01(j) in eliminating the strategic advantage of colliding with the defensive player at second base than some other, unobserved, broader change in player safety that would have manifested similarly across all 3 infield bases.

Second, if a reduction in the number of injuries was effected by the rule change, then we would expect players to respond by changing their play pattern almost immediately after the rule was implemented. To address this question, we qualitatively compared the evolution of the number

**Figure 2.** Total number of collision-related injuries by base per season, 2010-2019.

**Table 2**

| Season       | Before rule change | After rule change |
|--------------|--------------------|------------------|
| Days Missed, Median (25th-75th Percentile) | Days Missed, Median (25th-75th Percentile) | Days Missed, Median (25th-75th Percentile) |
| First Base   | 2 (1-9)            | 2 (1-8)          |
| 2010         | 3 (2.25-5.75)      | 2 (1-9)          |
| 2011         | 4.5 (2-10)         | 2 (1-7)          |
| 2012         | 2 (1-7)            | 2 (1-7)          |
| 2013         | 1 (1-7.5)          | 2 (1-7)          |
| 2014         | 2 (1-3.5)          | 2 (1-7.5)        |
| 2015         | 1 (1-2)            | 2 (1-8.75)       |
| Afer rule change | 2 (1-8)            | 2 (1-8)          |
| 2016         | 2 (1-5.5)          | 2 (1-5)          |
| 2017         | 2 (1-3)            | 2 (1-3)          |
| 2018         | 1 (1-2)            | 2 (1-3)          |
| 2019         | 2 (1-2)            | 2 (1-12)         |
of collision-related injuries in the years before the rule change. If the trend was that the number of collision-related injuries was decreasing before the rule change, then it is possible that any observed reduction in collision-related injuries in the seasons after the rule change was attributable to the preexisting trend rather than to the rule change itself. However, if rule 6.01(j) were a meaningful driver of change in the number of collision-related injuries, then we would expect a sharp discontinuity in the number of such injuries in the 2016 season. We found the largest season-to-season change in the number of collision-related injuries between the 2015 and 2016 seasons, a finding that supports the hypothesis that rule 6.01(j) was responsible for the reduction in collision-related injuries over the course of the 2016 to 2019 seasons.

Finally, if rule 6.01(j) improved player safety, then we might expect that change to be reflected in a change of the severity of collision-related injuries for defensive players. To address this question, we compared the median number of days missed because of infield collisions in the seasons before and after the rule change. We did not observe a statistically or clinically relevant difference in median days missed because of infield collisions. This finding is in keeping with that of Green et al. In the present study, the likely explanation for this finding is that the median number of days missed before the rule change was only 2 days and that, therefore, there was little room for improvement in injury severity (when measured via days missed) as a result of rule 6.01(j).

Limitations

There are several limitations that should be considered when interpreting the results of this study. The methods used in the present study do not allow for causal inference. Therefore, the results of this study should not be read as definitively proving that rule 6.01(j) improved player safety. However, 3 additional analyses were conducted with an eye toward disproving alternative explanations for our findings. Because of data limitations, the present results cannot be directly tied to defensive collision injuries that occurred specifically during an offensive slide, which is the baseball game action that rule 6.01(j) was implemented to change. Instead, the present results describe all infield collisions between players of opposing teams, and it is possible that all (or some) of these collisions occurred as a result of game actions other than sliding. Finally, although days missed is a commonly used metric across professional sports as a surrogate for injury severity, it is possible that days missed does not fully capture injury severity.

CONCLUSION

MLB and the MLB Players Association agreed to implement rule 6.01(j) at the start of the 2016 season with an eye toward improving player safety during slides. The rule was designed primarily to protect defensive players in the infield. The results of this study suggest that the rule was successful in achieving its aim, especially for defensive players at second base. This outcome is a cause for optimism that continued collaboration between MLB and the MLB Players Association can lead to meaningful improvements in player safety.

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