Reduced Time to Return to Play after Concussion in National Hockey League Players: An Analysis of the Incidence, Performance, and Financial Impact of the Updated NHL Concussion Protocol

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INTRODUCTION: Concussions occur commonly in the National Hockey League (NHL) and create significant burdens to players and teams. In the 2016-2017 season, the NHL concussion protocol (NHLCP) was updated to include further baseline testing, protocols to remove players and return to play, as well as spotters to identify concussions. The impact of this protocol change has yet to be examined. Therefore, the purpose of this study was to compare incidence, player performance, and team financial costs following a concussion before and after implementation of the NHLCP.
METHODS:
A retrospective review of NHL players who sustained a concussion from 2000 to 2021 was performed utilizing an online database. Players sustaining a concussion from 2000-01 to 2015-16 were included as pre-NHLCP; those sustaining a concussion from 2016-17 to 2020-21 were included as post-NHLCP. Standard performance data were collected 30 days before and after concussion. Standard and sabermetric (available from 2008-2021) performance data was collected 1 season before and after concussion. Sabermetric (available from 2008-2017) performance data was collected 3 seasons before and after concussion. Player and replacement salaries were collected and adjusted for inflation and total cost of concussion was calculated.
RESULTS:
Incidence: Overall, 433 players (405 skaters, 28 goalies) sustained concussions with 330 players (313 skaters, 17 goalies) in the pre-protocol group and 121 players with concussions (108 skaters, 13 goalies) in the post-protocol group. No significant differences in incidence were found (P=0.756) between groups, with 25.38 versus 27.40 concussions per season in the pre- compared to the post-protocol groups, respectively. The average return to play significantly decreased (P=0.022) from 20.08 to 15.74 days from the pre- to the post-NHLCP group, respectively.
Financial Data: No significant differences in average adjusted salary of players were found, but the average adjusted salary of replacement (P=0.032) significantly increased between the pre- and post-NHLCP groups from $744,505.37 to $896,942.54. The average cost of time missed decreased but did not differ significantly between groups. There was a significant downward trend in average length of time missed from 2000-2021 (R2=0.335, P=0.005). There was a significant positive association between average length of time missed and team financial cost (R^2=0.215, P=0.030).
Standard Performance Data: There were no significant differences in standard performance data in the 30-day or 1-season intervals after a concussion for skaters or goalies in the pre- or post-NHLCP groups or for skaters overall.
DISCUSSION AND CONCLUSION:
The present study found a similar incidence of concussions in NHL players between pre and post-NHLCP with a faster return to play post-NHLCP. There was no significant difference in player performance before and after concussion in both pre-NHLCP and post-NHLCP groups at 30 days and 1 year. Mean return to play was positively correlated with mean cost, but overall no differences in mean cost from concussion were found between pre and post-NHLCP.

Figure 1. Total number of concussions per year for skaters and goalies from 2000 to 2021. The vertical line indicates the implementation of the NHLCP.

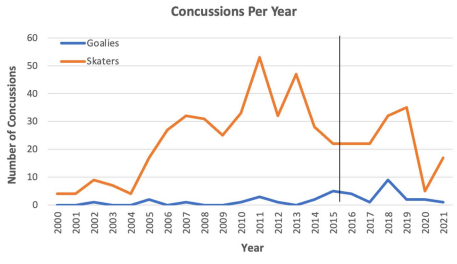

Figure 2. Regression analysis assessing trends in average return to play (blue) and cost (orange) of concussion (blue) over time. A significant decrease (R^2 = 0.335, P = 0.005) in return to play was demonstrated over time. A non-significant increase in cost was demonstrated over time.