

I. ABSTRACT

This study examines the impact of player injuries on NFL team win probabilities over the seasons 2013 to 2019. The research dissects the data by the number of injuries, overall team influence, and the effect at each position. The findings suggest that injuries have a variable impact on win probabilities, with certain positions showing a more pronounced effect.

II. EXPLORING POSITION LEVEL DATA

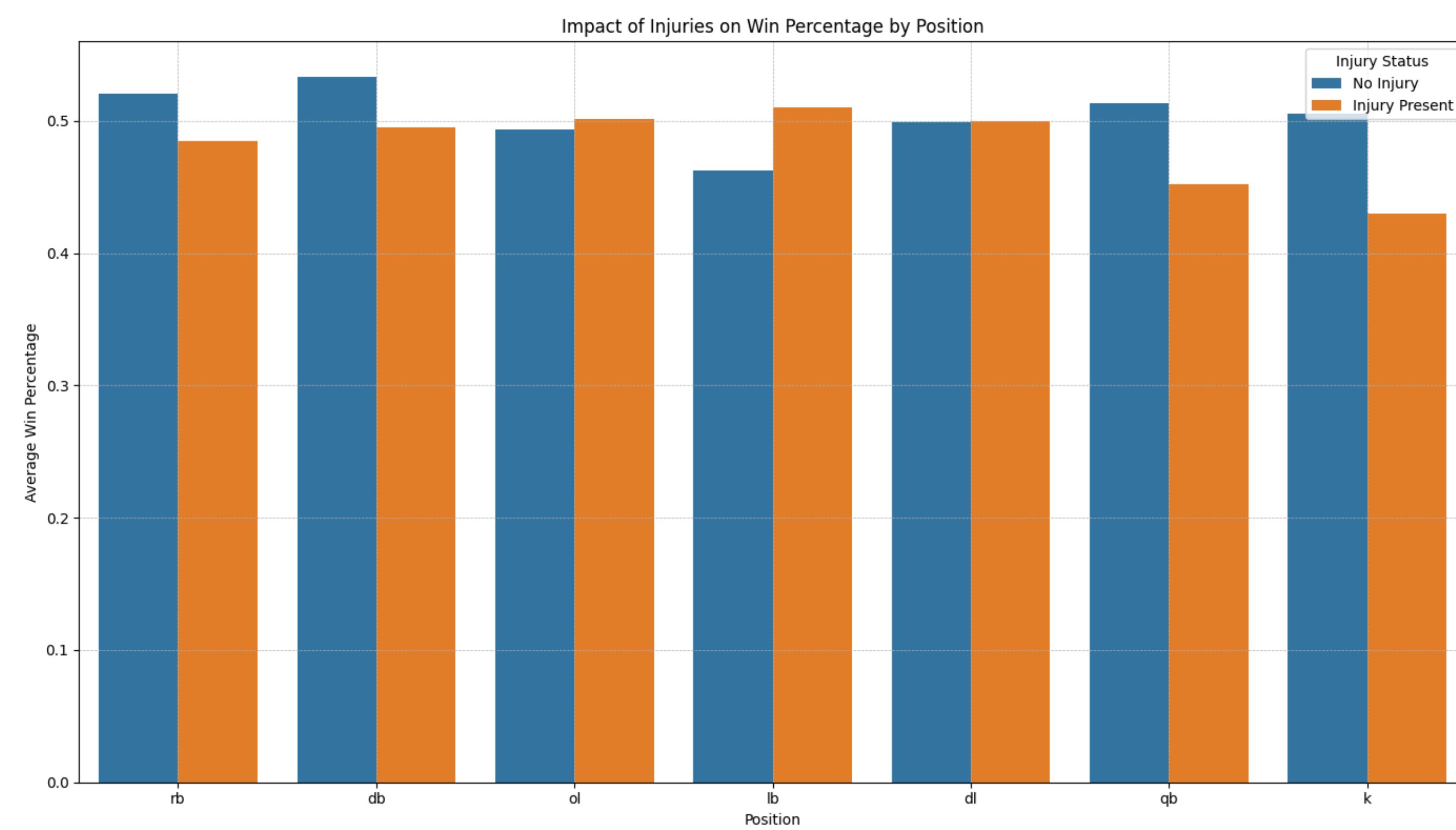


Figure 1: Positional Injury Impact on Win Probability

Position	Coefficient	P-value	95% CI Lower	95% CI Upper
rb	-0.1436	0.0341	-0.2764	-0.0107
db	-0.1519	0.1391	-0.3532	0.0494
lb	0.1933	0.0179	0.0333	0.3532
dl	0.0036	0.9619	-0.1435	0.1506
te	0.1444	0.031	0.0132	0.2757
wr	-0.2033	0.0063	-0.3491	-0.0575
p	0.1981	0.3218	-0.1938	0.5899
ol	0.0332	0.6962	-0.1334	0.1997
ls	-0.2847	0.0717	-0.5946	0.0252
qb	-0.2468	0.0022	-0.4049	-0.0887
k	-0.304	0.0183	-0.5565	-0.0515

Figure 2: Weights and Statistical Significance by Positions

III. KEY FINDINGS ON POSITION IMPACT

- Significant Impact: QBs, RBs, WRs, and Kickers correlate strongly with win probabilities.
- Positive Surprises: TEs and LBs show unexpected positive effects on wins.
- Insight: Positions traditionally seen in support roles may have underrated contributions to team success.

All findings are statistically significant, highlighting areas for strategic team development.

IV. MODEL

To investigate the impact of injuries on team performance, we employed a logistic regression model. This model allowed us to control for team-specific effects and incorporate dummy variables for each position, indicating whether an injury was present.

The logistic regression equation can be represented as follows:

$$\log\left(\frac{P(Y = 1)}{1 - P(Y = 1)}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n \quad (1)$$

Where: - $P(Y = 1)$ is the probability of a team winning given the set of predictors. - β_0 is the intercept. - $\beta_1, \beta_2, \dots, \beta_n$ are the coefficients for each predictor X_1, X_2, \dots, X_n , including team effects and injury status for each position.

This model allows us to quantify the impact of injuries across different positions on the likelihood of a team's win, adjusting for inherent team strengths and weaknesses.

V. CONCLUSION

Our findings highlight the nuanced impact of player injuries on NFL teams' performance. The logistic regression model revealed that certain positions are more critical to a team's win probability. This analysis contributes to a deeper understanding of strategic team management and injury prevention in professional sports.