

THE EFFECT DAYS BETWEEN MATCHES HAS ON STATISTICAL  
PERFORMANCE FOR NCAA DIVISION I MEN'S SOCCER PROGRAMS

by

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Men's Soccer Programs

A project submitted in partial fulfillment of the requirements for the degree of Master of  
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## **DEDICATION**

This project is dedicated to my family. Their help and support has allowed me to achieve my goals. Without their support none of this would have been possible. Thank you.

## **ACKNOWLEDGEMENTS**

I would like to thank everyone for providing me with the support and guidance to complete this project. Thank you to my project chair Dr. Brenda Wiggins, Professor Craig Esherick, Mr. Andy Ruge, and Dr. Clifton Sutton for being instrumental throughout this project. Special thank you to Greg Andrulis, Josh Fleming, Julian Dorsey, Brenna Connell, and Ashlee Danielle as each of you contributed to the success of this project.

## TABLE OF CONTENTS

	Page
List of Tables.....	v
List of Abbreviations.....	vi
Abstract.....	vii
Introduction.....	1
Problem Statement.....	1
Purpose of Study.....	2
Hypothesis.....	3
Literature Review.....	5
Purpose of Literature Review.....	5
Performance Factors.....	5
Attendance Factors.....	6
Decision Making.....	7
Methodology.....	9
Results.....	11
Conclusion.....	16
Appendix.....	18
References.....	21

## LIST OF TABLES

Table	Page
Table 1: Logistic Regression.....	11
Table 2: Positive Statistic Averages .....	12
Table 3: Negative Statistics Averages.....	13
Table 4: Home-Away-Neutral.....	14
Table 5: Days Rest- Winning Percentage.....	14
Table 6: Average Attendance.....	15

**LIST OF ABBREVIATIONS**

- National Collegiate Athletic Association.....NCAA
- DI.....Division I
- RPI.....Rating Percentage Index

## **ABSTRACT**

### **THE EFFECT DAYS BETWEEN MATCHES HAS ON STATISTICAL PERFORMANCE FOR NCAA DIVISION I MEN'S SOCCER PROGRAMS**

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George Mason University, 2017

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This research project was designed to provide evidence on whether the number of days between NCAA Division I soccer matches affects the statistical output and probability of winning. Statistics were gathered from the top 25 ranked teams for the 2010 and 2014 seasons and were grouped into two categories: positive statistics and negative statistics. Positive statistics consisted of shots, shots on goal, goals, corner kicks, fouls suffered, and wins. Negative statistics included shots conceded, shots on goal conceded, goals conceded, corner kicks conceded, fouls committed, and losses. Statistics were gathered from 1,022 matches and the results did not indicate there were significant correlations for the days between matches and positive statistics as well as the probability of winning the match. Negative statistics on the other hand did show evidence of a relationship between the two. Top 25 men's soccer programs statistically had the best negative statistics when playing on three days rest and their worst results when playing on six days rest.



## **INTRODUCTION**

After hosting the World Cup in 1994 and the introduction of Major League Soccer in 1996, the last 20 years has seen rapid growth of soccer in the United States at all levels. With this rapid growth, overall attendance has increased; but at the college level, programs are struggling to attract the number of fans which college football and basketball are drawing. If men's college soccer is going to become a major player on the National Collegiate Athletic Association (NCAA) sports scene, the sports community needs to evaluate what they can do to appeal to more people. To accomplish this, players must be able to perform at their highest level to produce the most exciting match with plenty of action to keep fans engaged. Researching the effect days between matches has on statistical performance should provide valuable information for coaches, administrators, and conferences to make decisions.

### **Problem Statement**

To increase attendance at men's college soccer matches, the quality of play and excitement delivered must be of the highest quality possible to compete for viewership. While passionate soccer enthusiasts will follow their teams regardless of circumstances, it is the casual fans that are needed for significant increases in attendance at men's college soccer games. The sport may not be enough to make people want to attend a match since

keeping a person's attention is difficult if they are not being fully engaged and excited by the event (Petrecca, 2000).

One of the constant criticisms of soccer versus other sports such as basketball and football is the lack of enough scoring and excitement. In the last 10 NCAA DI championship games, an average of 1.4 goals were scored per game. With basketball totals easily reaching over 100 points per game and football not far behind, one can understand the lack of excitement. Many soccer enthusiasts would argue if you understand the sport of soccer, then some of the most exciting games can be 0-0; and some of the worst played games end up with six or more goals. Outside of goals, many other areas can lead to an exciting game, which would keep the casual fan engaged. Teams who relentlessly attack an opponent's goal with shot after shot, even if not rewarded with a goal, can create a lot of excitement. It is this excitement that is needed to attract new fans to the college game.

### **Purpose of Study**

Concerns ranging from venue availability to injury prevention are at the forefront of scheduling conversations. Athletes' health should be the primary focus of scheduling as nearly two thirds of all players pick up at least one injury a season that causes them to miss a game (Hagglund, Walden, & Ekstrand, 2009). Scheduling of sporting events has long been an area of interest and concern to different sports teams of all levels and backgrounds. If an organization is not careful in scheduling their matches appropriately, they can be working against themselves in diminishing the product they set out to

provide. One particular area, and the focus of this study, is to understand how the number of days of rest between each match affects a team's statistical performance and most importantly, their probability of winning. Goals scored in soccer are not always the best determining factor, whether a game is exciting or not. Other statistical figures such as shots, corner kicks, or fouls can provide a more clear measurement to the level of action in soccer games.

The purpose of this study is to provide objective data from which decisions about scheduling can be made. Decision making can occur from multiple levels: coaches, athletic directors, or personnel at the conference and NCAA. Each party will have certain statistics that are more relative to their decision making. Head coaches will likely be more interested in seeing how the number of days between matches affects their teams' winning probability. Athletic directors might be more interested in goals scored, which could boost attendance. On the other hand, the NCAA and conference personnel might be more interested in exciting games with lots of end to end action for both teams so they can appeal to the largest audience. By identifying the optimal number of days between NCAA DI men's soccer matches, the researcher believes each party will be able to make informed scheduling decisions based upon concrete evidence.

### **Hypothesis**

It is proposed that the data will show a parabolic curve in which the number of days rest has a correlation to statistical outputs of a match. With only one or two days rest between competitions, it is expected there will be low statistical figures in the following categories: shots, shots on goal, goals, corner kicks, fouls suffered, and wins.

As the days between matches increases, so should these statistics. The negative statistics are expected to follow the same bell curve. As the days of rest increase, so should the desired outcome of negative statistics. Giving teams three or four days off between matches should yield an increase in positive statistics compared to one or two days rest.

It is also believed there will be diminishing returns after five days in which it will not affect statistical output. The literature suggests there will be a drop off at six days or longer where anything beyond this will not have an effect on positive or negative statistics.

## **LITERATURE REVIEW**

### **Purpose of Literature Review**

There are many variables playing pivotal roles in men's college soccer which are all intertwined. Organizations would like a great atmosphere at the game to get more people attending but they may also need a winning and/or exciting team to achieve this. Dissecting each variable independently can provide a better understanding of the importance of each statistic and the role those variables play.

### **Performance Factors**

The components of soccer are extremely demanding technically, tactically, physiologically, and psychologically. Women's college soccer players, depending on their position, have been recorded running 8-11 kilometers, and completing 70-190 high-intensity runs in one game (McCormack et al., 2015). This physical demand placed on a player can lead to serious fatigue not only during the game but also for days afterwards. Research has shown at least 72 hours are required for soccer players to recover to pre-match levels (Nedelec et al., 2012). However, conferences and the NCAA often require teams to play within two days of each other and often one of these is devoted to travel.

In addition to physical fatigue, players also incur mental fatigue which “induces psychological stress on players due to the need for sustained concentration, perceptual skills, and decision making combined with opponent pressure during the match” (Nedelec et al., 2012, p. 1000). Student-athletes are continually under pressure to keep up with classwork and balance their time between sport and studies. In addition, a congested match calendar, lengthy travels, and lack of rest can create very fatigued players unable to perform at their highest levels.

### **Attendance Factors**

By improving the performance, excitement, and overall product at college soccer games, one could conclude a rise in attendance. Attendance at sporting events can generate significant revenue for college sports teams. From ticket sales to concession sales, the more people in attendance at matches the more money that can be generated for the program. Higher attendance may also generate opportunities for sponsorships and television deals (Hall et al., 2010). Introduction of more television deals can create a greater reach to casual fans who may not have thought of attending a local college soccer game.

Attendees at college soccer come in many shapes and forms. From a new soccer parent bringing their child to their first soccer game to the diehard soccer enthusiast, all make up a very diverse crowd. Diehard fans or “True Fans” will show up regardless of performance, day of the week, or any other outside factor. These true fans are often first thought of when discussing sport fans but another fan serves as the majority, the casual

fan (Hall et al., 2010, p. 328). Casual fans are very difficult to win over, especially with soccer. With a lack of scoring, soccer is very difficult to appreciate without understanding the sport. The more shots and chances on goal and faster speed of play, may all create the excitement to capture the casual fan. There are many other events, sport and non-sport, competing for attendance by these fans. When participants finally decide on an event, confirmation that they made the right choice or retention must be validated.

### **Decision Making**

The decision making for scheduling soccer matches has many factors that have to be taken into account. Before programs can make a decision, they must decide on what is their desired outcome. Is the main goal of the program to increase attendance, improve overall fan experience, winning, or the athlete's health and safety? Depending on the desired outcomes, the criteria used for decision making may differ greatly.

Using increasing attendance as the desired outcome, criteria such as date/time of the match and scheduled opponent would be weighted heavily. With the athlete's health and safety as the desired outcome, the number of days between matches would then be the most important, as this allows the athletes to recover from competitions. Often there are multiple desired outcomes which overlap and can have conflicting criteria. A program may be faced with an athletic department's desire to increase attendance at home matches to generate more revenue. However, their most attended matches may be on Fridays and Saturdays which if scheduled back to back could pose an issue to the

health and safety of the athletes. Injuries are a major concern at the end of the season during conference and national tournaments when multiple matches are played in a short time frame. Cost of travel is another major concern as hotels, buses/planes, and food costs can be very taxing on a team's budget, not to mention the number of classes missed by the athletes during this time. The tournament staff and athletic departments also have constraints with scheduling facilities and costs of staffing the event. This can all lead to tournaments putting more emphasis on playing sequential days or with only one or no days between matches.

The goal of this study is not to decide which outcomes should be more desirable than others but to provide information so organization personnel can make an informed decisions. Each organization will have their own goals they are looking to achieve and will select different criteria from which to evaluate. The statistics compiled cover many different areas and provide a wide base from which many inferences can be made.



## METHODOLOGY

Statistics were collected from the NCAA's statistic archives, <http://stats.ncaa.org/team>. Data was compiled in excel spreadsheet for the top 25 ranked NCAA Division I Men's Soccer programs at the end of the season from 2010 and 2014; a total of 1,022 games. Statistics gathered were placed into two groups: positive statistics and negative statistics. Positive statistics included: shots, shots on goal, goals, corner kicks, fouls suffered, and wins. Negative statistics gathered were: shots conceded, shots on goal conceded, goals conceded, corner kicks conceded, fouls committed, and losses. Desired outcomes are positive statistics, while negative statistics are undesirable outcomes. Days between each match for each team as well as their RPI was also recorded along with attendance, home versus away, and day of week.

From this data, a logistic regression was run to determine the significance, if any, the number of days between matches had on the probability of winning. Draws were grouped with losses for a binary outcome, winning or not winning, as the analysis looked for the probability of winning. In addition, averages for positive and negative statistics were also calculated for each number of days between matches, one to six. The following days were omitted from the results due to small sample size (< 20), 0 and 7 to

13. Statistical information was charted and graphed to see if there were any patterns to the data set and what conclusions, if any, could be made from the evidence.

Information for each statistical category was recorded from the NCAA website for every regular season and postseason matches played during the five year span. One game was omitted as it was against a non-NCAA Division I soccer team as well as the first 50 games of each season where the number of days rest could not be calculated.

This study was approved by The Institutional Review Board in advance of this study as the Office of Research Integrity and Assurance determined this project does not meet the definition of human subject research according to federal regulations. Analysis of the findings was documented.

## RESULTS

The logistic regression showed conclusive evidence in which the number of days rest does not affect the probability of winning in a match. The single most important factor was the difference in RPI in predicting the probability of winning.

Table 1: Logistic Regression

	estimate	std. error	z value	PR(> z )
Difference in RPI Rank	-0.020858	0.00181	-11.526	< 2e-16
Difference in Days Rest	0.007673	0.033178	0.231	0.8171

For two teams having equal chances of winning on equal days between matches, one extra day increased the probability of winning to 0.502, two extra days 0.504, and three extra days 0.506. The number of days between each match was proven to be an insignificant indicator in the probability of winning.

Analysis of positive statistical figures did not provide conclusive evidence showing a direct correlation with numbers of days' rest. Excluding variables without at least 20 games played, the results are scattered without a defined curve as seen in Table 2. No definitive conclusions can be made from positive statistical analysis due to the majority of figures having the most desirable and least desirable outcomes separated by only one day of rest.

Table 2: Positive Statistic Averages

<b>Positive Statistics</b>						
<u>Days of Rest</u>	<u>Goals Scored</u>	<u>Shots</u>	<u>Shots on Goal</u>	<u>Corner Kicks</u>	<u>Fouls Suffered</u>	<u>total # games</u>
1	1.85	15.19*	6.59*	5.61	12.09	142
2	1.77	14.15**	6.12	5.46	11.70	247
3	1.77	14.69	6.27	6.06*	11.51**	251
4	1.75	15.08	6.23	5.06**	11.68	118
5	1.92*	14.49	6.45	5.30	13.33*	98
6	1.30**	14.22	5.60**	5.44	12.51	117

\*Most desirable outcome in each positive statistical category

\*\*Least desirable outcome in each positive statistical category

Unlike the positive statistical categories above, the negative statistical categories did reveal a pattern when analyzed. The data in Table 3 shows a grouping of the most desirable negative statistics around three days between matches and a grouping of least desirable statistics at six days between matches. This evidence indicates three days between matches produces the most desirable negative statistics for top 25 teams but after six days between matches, it produces the least desirable outcomes.

Table 3: Negative Statistic Averages

<b>Negative Statistics</b>						
<u>Days of Rest</u>	<u>Goals Conceded</u>	<u>Shots Conceded</u>	<u>Shots on Goal Conceded</u>	<u>Corner Kicks Conceded</u>	<u>Fouls Committed</u>	<u>total # games</u>
1	0.93	11.72	4.68	4.18	11.67	142
2	1.00	10.94	4.59	4.20	10.92*	247
3	0.88	9.79*	3.92*	4.03*	11.20	251
4	0.84*	11.57	4.34	4.03	11.42	118
5	1.23**	11.20	4.52	4.21	12.26	98
6	0.95	11.67**	4.73**	4.42**	12.44**	117

\*Most desirable outcome in each positive statistical category

\*\*Least desirable outcome in each positive statistical category

During the study additional statistical information was collected on other important factors when scheduling soccer matches. The following graphs highlight this data which could prove to be useful in decision making by head coaches, athletic directors, or conference and NCAA personnel.

Table 4: Home-Away-Neutral Record

<b>Home vs Away vs Neutral</b>			
	<b><u>Overall Home Record</u></b>	<b><u>Overall Away Record</u></b>	<b><u>Overall Neutral Record</u></b>
Record	382-88-59	218-131-59	51-23-10
Total Games	529	408	84
Winning Percentage	72%	53%	61%

Table 5: Days Rest- Winning Percentage

<b>Number of Days Rest - Winning Percentage</b>				
<b><u>Days Rest</u></b>	<b><u>Home</u></b>	<b><u>Home Win Percentage</u></b>	<b><u>Away</u></b>	<b><u>Away Win Percentage</u></b>
1	46-13-5	72%	26-10-4	65%*
2	96-14-9	81%*	61-42-19	50%
3	125-26-16	75%	60-28-12	60%
4	46-8-7	75%	22-9-9	55%
5	25-7-9	61%	22-13-7	52%
6	37-17-8	60%**	21-26-5	40%**

\*Most desirable

\*\*Least desirable

Table 6: Average Attendance

<b>Average Attendance</b>	
<u>Day</u>	<u>Avg. Attendance</u>
Monday	1148
Tuesday	1246
Wednesday	1054**
Thursday	1089
Friday	2153*
Saturday	1429
Sunday	1386

\*Highest Average Attendance

\*\*Lowest Average Attendance

## CONCLUSION

Days between matches does not significantly affect the probability of winning or statistical performance. The evidence does not support the hypothesis of a parabolic curve of diminishing returns or a relationship between days among matches and positive statistical output. However, the evidence does support a correlation from days between matches and negative statistics. The data shows a pattern where three days between matches is optimal for the most desirable negative statistics. In addition, six days rest proved the least desirable negative statistics.

As a head coach of a top 25 ranked team with a focus on winning, the most determining factor is RPI ranking and not having more days rest than your opponent. Scheduling games without trying to give extra days between matches will be unlikely to give you a better chance of winning. The quality of team played and not the number of days between matches is the biggest predictor in the outcome of a match. Inversely, coaches of non-ranked teams would rather play a top 25 ranked team on six days rest as this would give them the best chance of their opponent producing their worst negative statistical outputs.

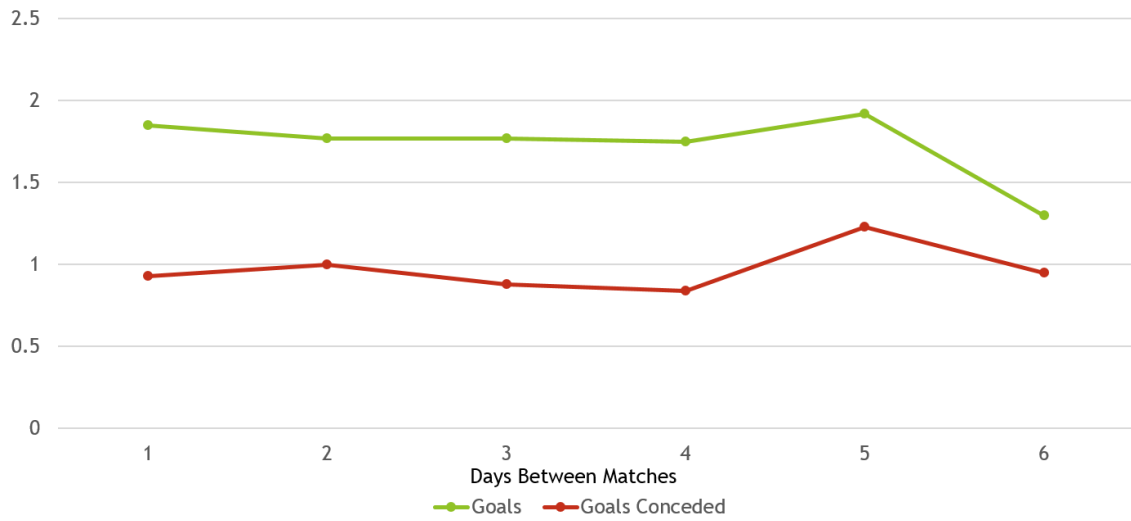


Tickets sales managers who might be more concerned with attendance figures, would like to see the most games played on Fridays with the largest average attendance of 2,153 spectators. With most conferences scheduling two games a week, it is hard to find attendance on days which are ideal. The second highest average attendance is Saturday and it would not be in the best interest of the athletes to play on back to back days. Playing one game a week, possibly Friday or Saturday, would likely give the best boost to attendance. However, with the number of games in the current fall schedule, the NCAA and conference personnel may need to look to a longer, possible year round season for best accommodations. A year round schedule could alleviate match congestion but would also allow players to develop the entire year. The current spring season is limited in the amount of time players can train together as a team. Increasing the amount time between matches and adding a full spring season should increase the quality of product college soccer has to offer to fans and the athletes.

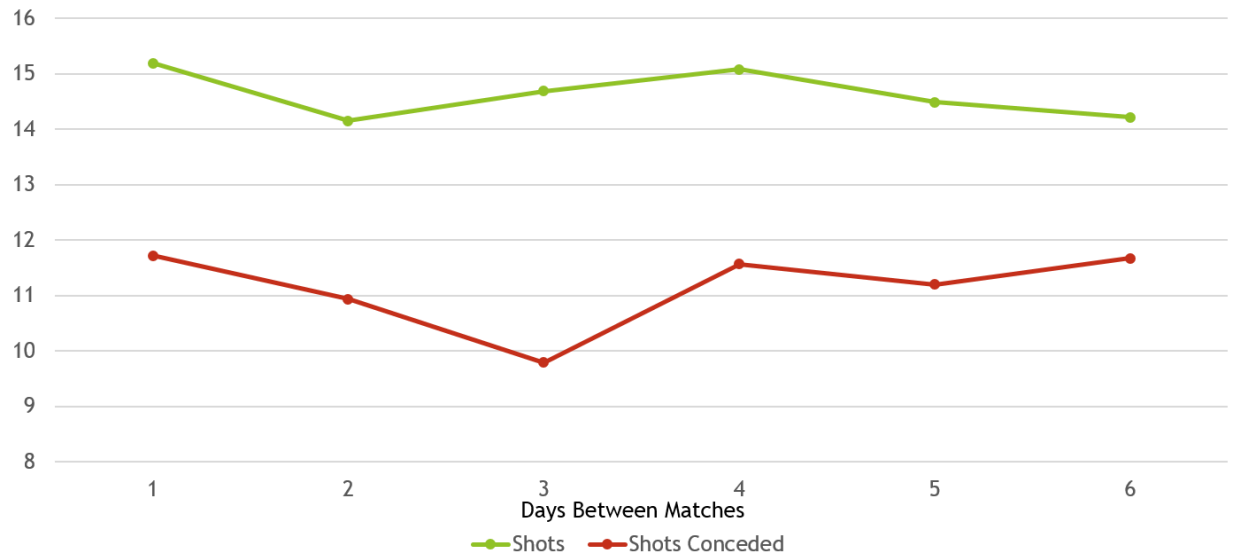
The evidence in this study shows there are correlations of days between matches and statistical performance. While this study analyzed just the top 25 ranked teams over two seasons, more research is needed to see how much of an impact the number of days rest has on non-top 25 ranked teams. The top programs tend to have deeper benches and would be the ones better prepared to play on short rest, as they can rotate their lineups more than weaker programs with less quality or experience on their rosters. This may be an explanation of why there were not more evidence supporting the hypothesis. Further research analyzing the weaker Division I soccer programs could lead to more conclusive evidence.

## APPENDIX

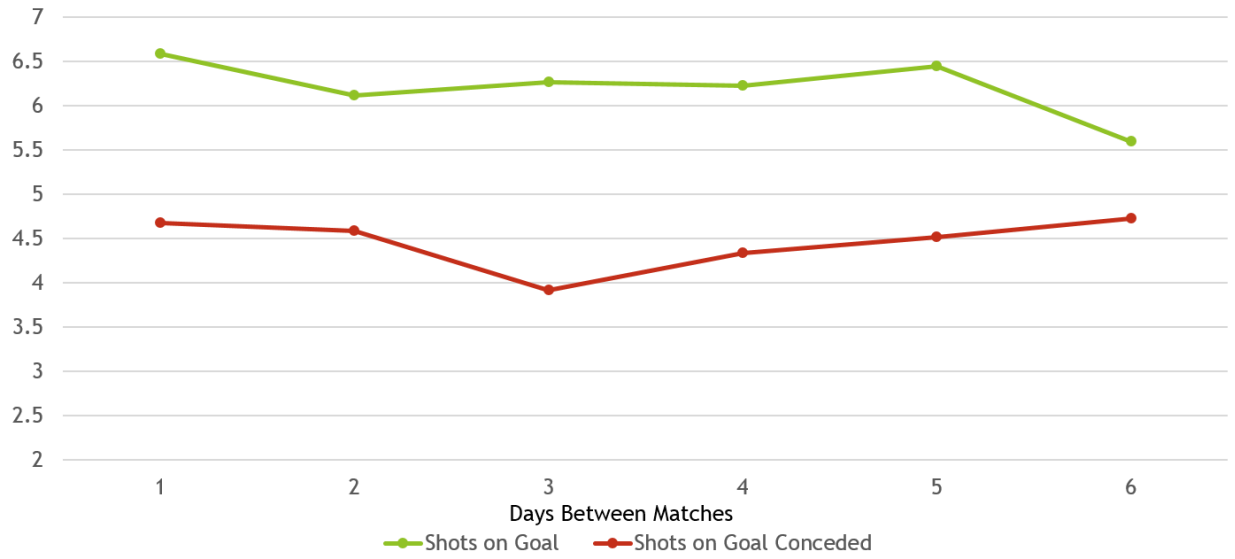
### Goals vs Goal Conceded



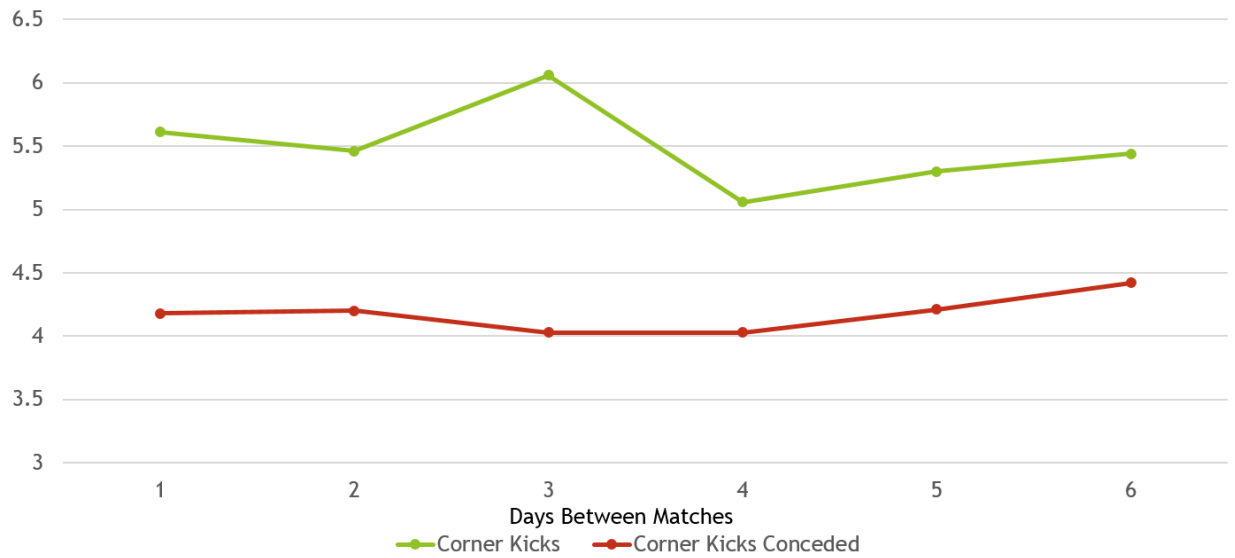
### Shots vs Shots Conceded



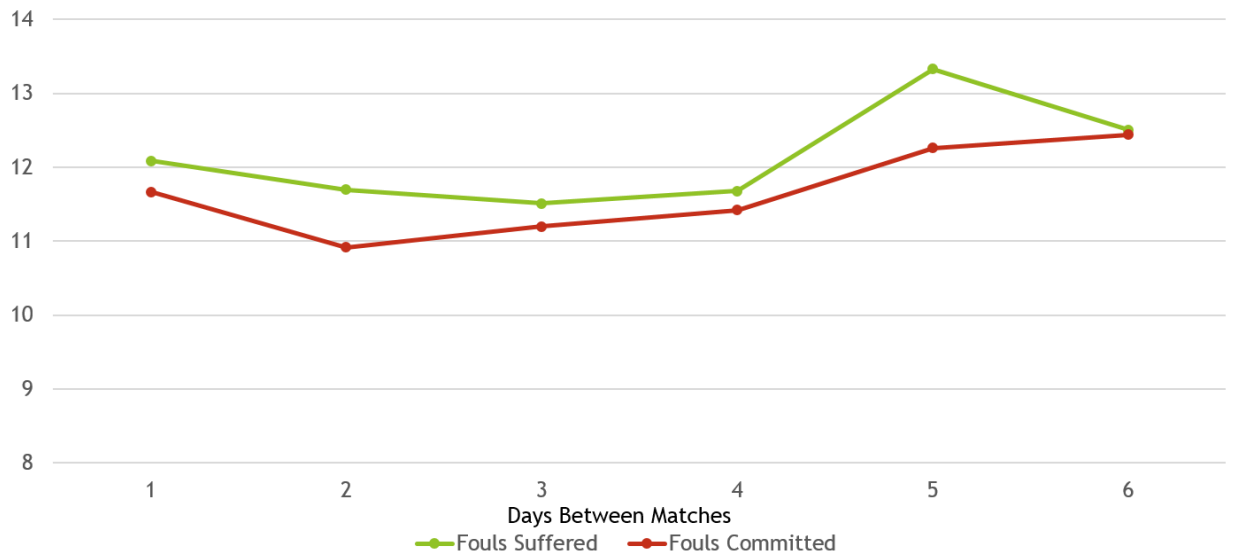
### Shots on Goal vs Shots on Goal Conceded



### Corner Kicks vs Corner Kicks Conceded



### Fouls Suffered vs Fouls Committed



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## **CURRICULUM VITAE**

Roger Wimmer graduated from Salem High School, Salem, Virginia, in 1999. He graduated with a Bachelor of Science from George Mason University in 2005. He currently works as the Director of Procurement, Athletic Services for George Mason University. In addition, he has coached youth soccer for DC United, Virginia Olympic Development Program, and currently coaches with Vienna Youth Soccer. He will receive his Master of Science in Sport and Recreation Studies with a concentration in Sport Coaching from George Mason University in 2017.