

Factors Affecting Increased Rate of ACL Injury in Female Soccer Players

Audrey Tomko, EAS 4480, April 18, 2024



Project Goal

- To investigate whether several potential factors show a correlation to an increase in ACL injuries in female soccer players
- Factors include the number of minutes played in a season, player age, and whether they play for their national team

MOTIVATION:

- Professional women's soccer has grown at an incredibly rapid pace over the last 10 to 12 years
 - There are an increased number of fully professional leagues across the world, those leagues play more games in front of bigger crowds
 - National team tournaments have grown bigger
- The issue is that the science behind player safety has not grown at the same rate as the game, leading to a higher injury rate amongst female soccer players





BACKGROUND

- Female players have a 4-6x higher risk of tearing their ACL than their male counter parts
- In the last 5 years the rate of ACL injury has skyrocketed
 - An injury report on elite European clubs showed that there had been 1,527 ACL injuries from 2018–2022
 - Between January 2022 and December 2023 there were 306 confirmed ACL injuries in female soccer players across the world
 - At least 37 players were unable to compete in the 2023 World Cup due to ACL ruptures
- The causes of the sharp increase are largely not known due to the lack of research that has been done
- Some theories include (but are not limited to) cleat design, increased workload without proper strength training, switching between playing surfaces, women's anatomy simply being different and less studied than men's

ANALYSIS- Number of Minutes



- Average number of minutes played in a year versus the number of ACL injuries that occured that year
- Calculated the correlation coefficient:

a =

- Correlation Coefficient was found to be 0.2185
 - Does not appear to be correlated

2×2	
1.0000	0.2185
0.2185	1.0000
	2×2 1.0000 0.2185

- Plan to run this test again, but with a better data source (found about two hours ago)
- I believe that the average minutes played is likely skewed due to missing data points which were counted as zero minutes.

ANALYSIS- Number of Minutes



• Least squares regression of the number of minutes played and the number of ACL injuries in a year with the 95% confidence error bounds

ANALYSIS-Age

- The range of ages for soccer players who sustained ACL injuries between 2015 and 2023 is 20-37 years old
- I performed a t-test to see if athletes below the age of 26 were more likely to tear their ACL than athletes above the age of 26
- Calculated the average number of minutes played per year by each group in order to run the ttest
 - Can reject the null hypothesis that they have the same mean



Sources

- https://footystats.org/england/fa-womens-super-league
- <u>https://www.washingtonpost.com/sports/2023/07/18/acl-injury-tear-womens-soccerfemale-athletes/</u>
- <u>https://www.latimes.com/sports/soccer/story/2024-02-21/mia-fishel-acl-injury-uswnt</u>