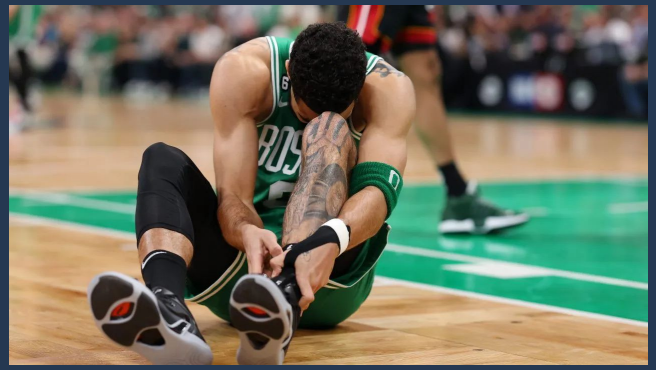
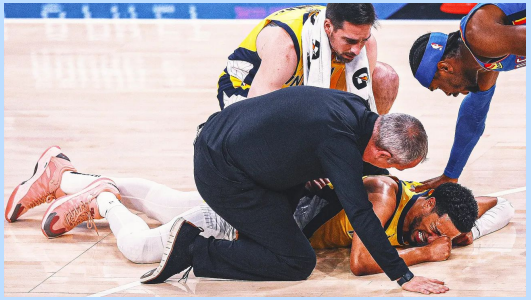
NBA Injuries Analysis



Dylan Hira

Project Objective



There is an increasingly common perception that the NBA is seeing a steep incline in injuries.

The goal of this project is to quantify the rise in injuries, determine what type of injuries are more common and potential reasons for why.

Steve Nash's hypothesis on the "Mind the Game" Podcast: pace and space style of play contributes to more wear and tear on the body.

Project Steps

	Date	Team	Acquire	Relinquished	Notes
37622	4/9/2023	Cavaliers		Caris LeVert	placed on IL with sore right knee
37623	4/9/2023	Grizzlies		Dillon Brooks	placed on IL with groin injury
37624	4/9/2023	Grizzlies		Ja Morant	placed on IL with right hand injury
37625	4/9/2023	Grizzlies		Jaren Jackson Jr.	placed on IL with sore left elbow
37630	4/9/2023	Kings		Davion Mitchell	placed on IL with sore left knee
37631	4/9/2023	Knicks		Trevor Keels	placed on IL with illness
37633	4/9/2023	Spurs		Zach Collins	placed on IL with lacerated finger

1.

Acquire injury log data. Found a dataset from Kaggle with data from 1951 - 2023.

2.

Clean data and map injury log notes to injury type (knee, ankle, shoulder, etc.). Quantify increases in injury types over time.

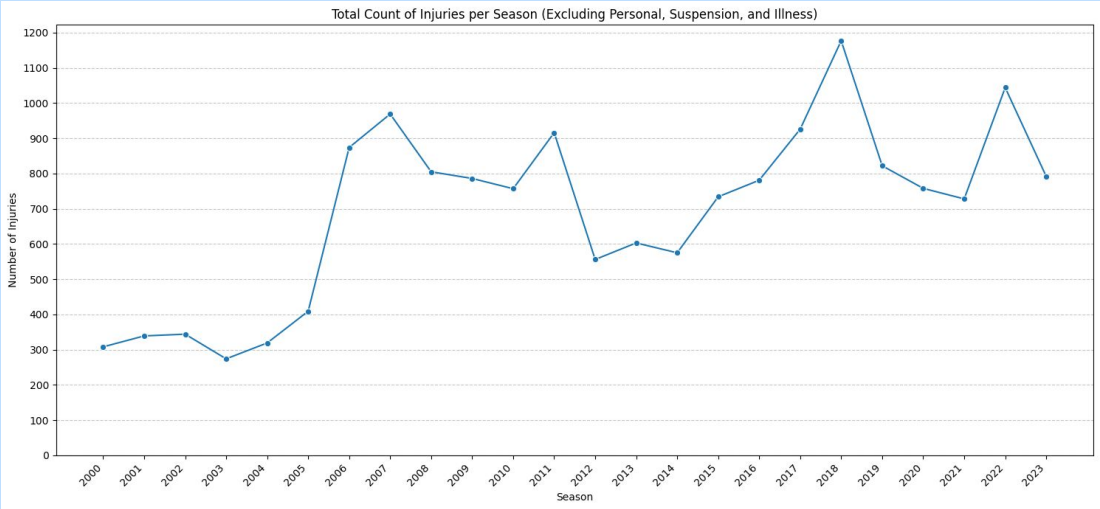
3.

Compare injury data to league-wide trends for each corresponding NBA Season

4.

Run regression analysis, determine which league-wide features influence which injuries the most. Calculate correlation coefficients.

Total Injuries Over Time Trend



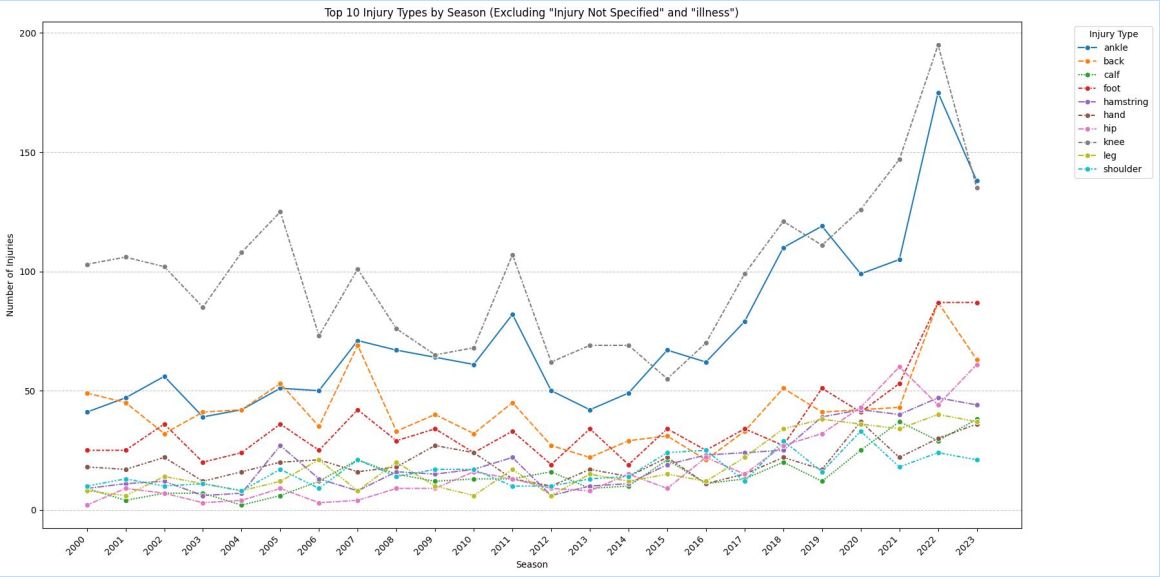
Mapped data to NBA season (Ex: 2012 = 2011-2012 season)

Upwards Trend. Certain dips can be explained by league events (2012 Lockout, Covid, etc.)

Data from 2023 does not include playoffs. IL entries for personal reasons, suspensions, and illnesses were not included.

Pre 1999–2000 injury log data was found to be less descriptive and thus removed from this project.

Injuries by Type Over Time



We see notable increases in the “Knee” and “Ankle” injury categories.

Selecting these injury types for further correlation analysis.

There were many injury types that were not specified in the injury logs.

Regression Analysis

- Features: FGA/G, Pace, 3PA/G, PF/G, FTA/G
- Dependent variable: total number of injuries for that season
- FGA/G, Pace, 3PA/G all quite significant based on p-values
- FGA/G -> negative relationship | Pace, 3PA/G -> positive.

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P-values for independent variables:
FGA/G    0.001339
Pace     0.007868
3PA/G    0.067595
PF/G     0.246513
FTA/G    0.995224
dtype: float64
```

Multiple Linear Regression Summary:

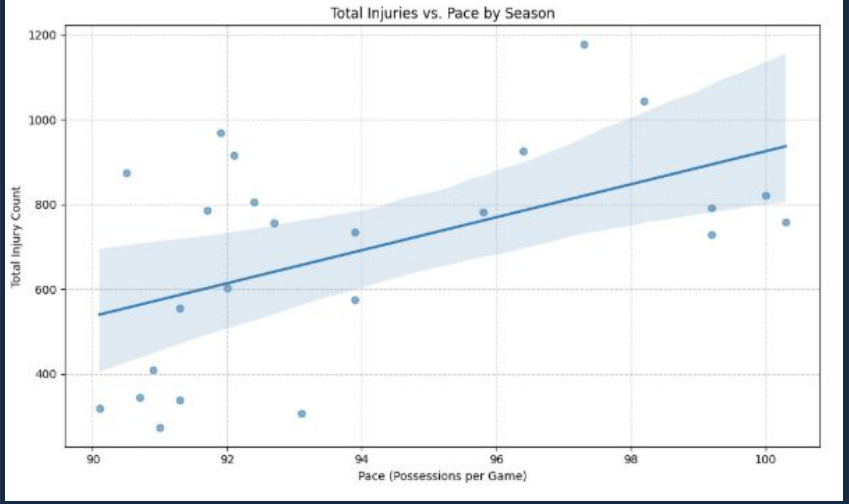
OLS Regression Results

Dep. Variable:	Injury_Count	R-squared:	0.724
Model:	OLS	Adj. R-squared:	0.647
Method:	Least Squares	F-statistic:	9.420
Date:	Mon, 24 Nov 2025	Prob (F-statistic):	0.000152
Time:	23:20:46	Log-Likelihood:	-150.89
No. Observations:	24	AIC:	313.8
Df Residuals:	18	BIC:	320.9
Df Model:	5		
Covariance Type:	nonrobust		

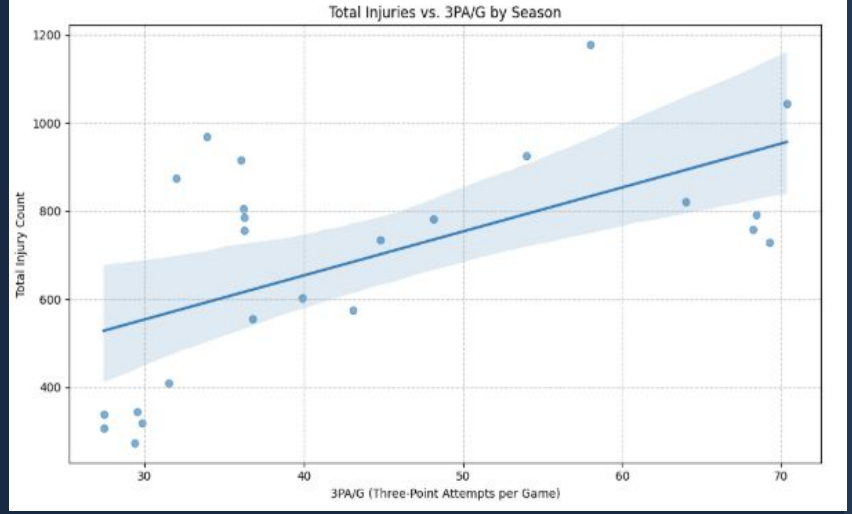
	coef	std err	t	P>|t|	[0.025	0.975]
const	5998.3107	3412.331	1.758	0.096	-1170.730	1.32e+04
FGA/G	-149.3187	39.391	-3.791	0.001	-232.076	-66.562
3PA/G	20.7515	10.670	1.945	0.068	-1.666	43.169
FTA/G	0.2083	34.318	0.006	0.995	-71.891	72.308
PF/G	-46.7983	39.069	-1.198	0.247	-128.879	35.282
Pace	219.0843	73.292	2.989	0.008	65.104	373.065

Correlation Analysis: Total Injuries

Correlation coefficient between Pace and Total Injuries: 0.519

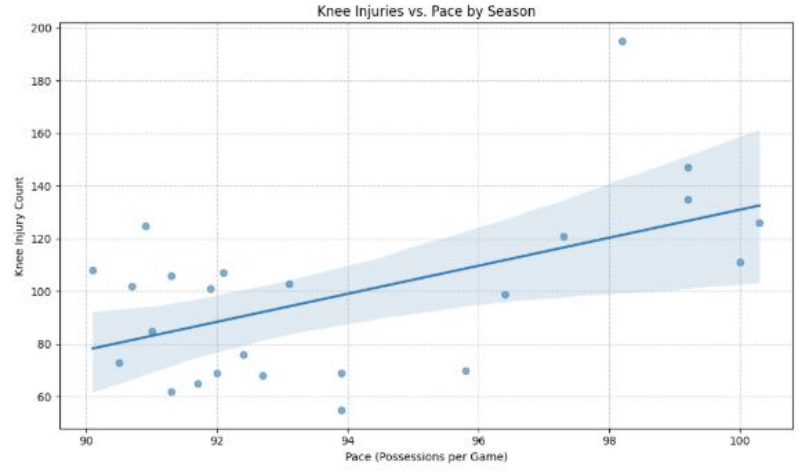


Correlation coefficient between 3PA/G and Total Injuries: 0.589

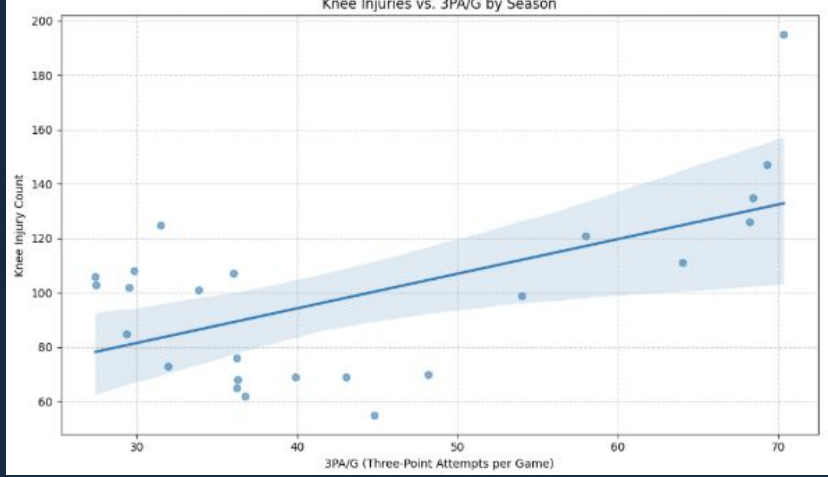


Correlation Analysis: Knee Injuries

Correlation coefficient between Pace and Knee Injuries: 0.549

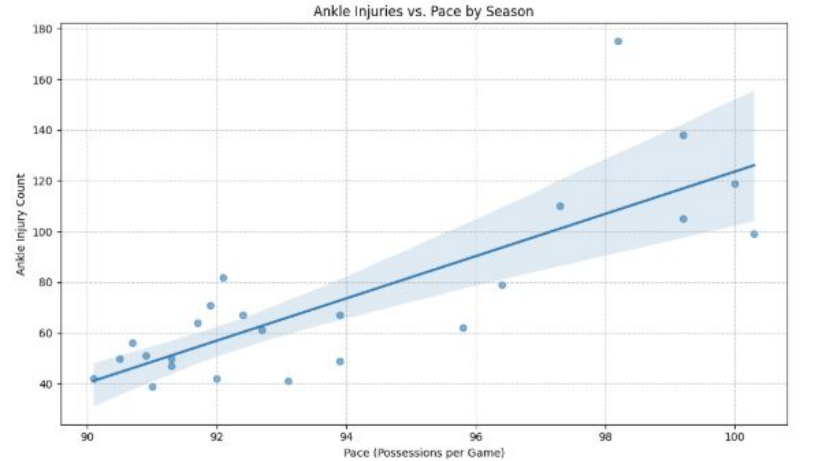


Correlation coefficient between 3PA/G and Knee Injuries: 0.582

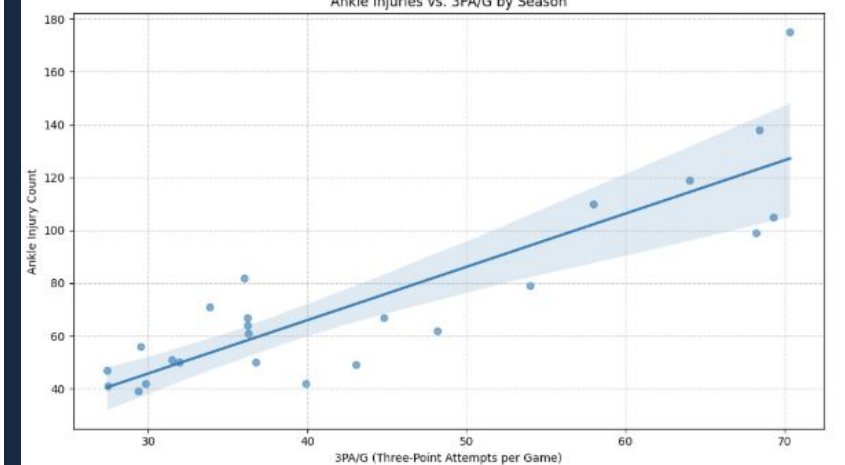


Correlation Analysis: Ankle Injuries

Correlation coefficient between Pace and Ankle Injuries: 0.811



Correlation coefficient between 3PA/G and Ankle Injuries: 0.870



Ankle Injuries Deep Dive

The top mechanism for ankle injury in basketball is landing on another player's foot.

This is followed by sudden changes of direction, and awkward landings after jumping.

Increased Pace and 3PA/G heightens the volume of both of these occurrences. The geometry of the game has changed where players must cover more ground and contest more jump shots within half court defense.

Fong DTP, Chan CWL, Ha SCW, et al. *"Biomechanical analysis of ankle ligamentous sprain injury cases from televised basketball games: understanding when, how and why ligament failure occurs."* *Journal of Science and Medicine in Sport.* 2017; 20(12): 1057–1061. PubMed+1

McKay GD, Goldie PA, Payne WR, Oakes BW. *"Ankle injuries in basketball: injury rate and risk factors."* *British Journal of Sports Medicine.* 2001; 35(2): 103–108. PMC+1

Summary

Injury frequency has increased over time in the NBA

- Pace and 3PA/G were the league-wide statistics found to contribute to this increase

Specifically, knee and ankle injuries have seen the steepest rise in recent years

- Moderate correlation between knee injuries and Pace + 3PA/G
- Strong correlation found between ankle injuries and those two factors

Ankle injury correlation with 3PA/G and Pace is consistent with injury mechanisms

- Most common cause of a basketball ankle injury is landing on another player's foot
- Increased 3PA -> more high acceleration/deceleration close-outs and contests on jumpers

Next steps

- Include injury duration as an additional element of the study.
- Evaluate injury frequencies at the team and individual level.
- Capture data after 2023 for additional observation.
- Further examine biomechanical mechanisms for the injuries taking place.