

### Higher Rates of Lower Extremity Injury on Synthetic Turf Compared with Natural Turf Among National Football League Athletes

Published in the American Journal of Sports Medicine, 2019

### **Overview**

Football is a strenuous sport for athletes. Researchers set out to test the hypothesis that playing on synthetic turf leads to an increased risk of lower body injury. Their hypothesis was informed by previous research showing a difference between synthetic turf and natural grass in releasing a cleat before reaching a potentially injurious overload situation. From collecting and analyzing injury report data from the NFL between 2012 and 2016, researchers deducted that if all NFL games played on synthetic turf were played on natural grass during the study period, 319 fewer lower body injuries would be expected. When examining noncontact knee, ankle and foot injuries, play on synthetic turf had a 56 percent higher rate of injuries resulting in any time loss and a 67 percent higher rate of injuries resulting in more than eight days of time loss. The increased risk of ankle/foot injuries resulting in any time loss and a 103% increase in injuries resulting in more than eight days of time loss. These findings support the hypothesis that playing on synthetic turf increases the risk of lower body injury.

### **Background and Method**

Previous research has revealed that football cleats interact differently on synthetic turf and natural grass, which may lead to a different risk of injury. Divots when a cleat creates a hole in the field—signal that the grass has absorbed force from the cleat and released the cleat back again, rather than capturing the cleat and releasing the force through a players' foot, ankle or knee, which could cause injury. Since cleats can easily create divots on natural grass and not on synthetic turf, less force is placed on the lower body, which may help prevent injury.

Data for this study came from the analysis of all 1,280 NFL regular season games played from 2012 through 2016, 555 of which were on synthetic turf and 725 on natural grass.

- All 32 NFL teams report injuries through a robust, unbiased electronic health record system. Each injury report gives full details of the injury and circumstance, such as the contact, impact, activity, time lost, game-day weather, and surface type and conditions.
- The researchers also examined the rates of contact-related injuries and noncontact-related injuries, **since noncontact injuries are more likely to be related to the playing surface.**
- **Incidence Rate Ratios (IRR)** were calculated to determine the exact amount of exposure to injury players may have in each game.



A total of **4,801** 

lower body injuries occurred from 2012 to 2016 affecting

**2,032** players.



If all NFL games played on synthetic turf were played on natural grass during the study period,

# **319** fewer

lower body injuries would be expected.

Play on synthetic turf had a

## **16<sup>%</sup>** higher rate

of lower body injuries than on natural grass. This included contact and non-contact injuries that resulted in any time loss. Noncontact injury rates to the lower body on synthetic turf vs. natural grass

27% higher on synthetic turf When examining noncontact knee, ankle and foot injuries, play on synthetic turf had a **56%** higher rate of injuries resulting in any time loss and a **67%** higher rate of injuries resulting in more than eight days of time loss.

The greatest difference in noncontact injury rates between synthetic turf and natural grass were to the ankle/foot: synthetic turf resulted in a **68%** higher rate of injuries resulting in any time loss and a **103%** higher rate of injuries resulting in more than eight days of time loss.

> 82.4% of NFL players think that artificial turf is more likely to contribute to injury

### 89.7%

of NFL players think that **artificial turf is more likely to shorten their career** 

| Increased Risk to Athletes of Suffering<br>Noncontact Injuries on Synthetic Turf |                                  |                  |
|--|----------------------------------|------------------|
|  | More than 1 Week<br>of Time Loss | Any Time<br>Loss |
| Lower Body   | 20%                              | 27%              |
| Knee   | 45%                              | 46%              |
| Knee/Ankle/Foot  | 67%                              | 56%              |
| Ankle/Foot   | 103%                             | 68%              |

89.1%

causes more

of NFL players think

soreness and fatigue

that artificial turf

#### Conclusions

Higher rates of lower body injury occurred on synthetic turf than on natural grass among NFL athletes from 2012 to 2016.

This trend was observed over 5 playing seasons, 1,280 games, and 213,935 distinct plays. The researchers' findings support that there is a difference between synthetic turf and natural grass in the ability to divot and release cleats from the surface.

**64.4**<sup>%</sup>

of NFL players think that artificial turf is more likely to negatively affect their quality of life after football.

> More broadly, their findings support the hypothesis that playing on synthetic turf increases the risk of lower body injury and that field surface has a causal effect on injury rates due to synthetic turf's lack of ability to release an athlete's shoe.

### Acknowledgments

The title of this research study is Higher Rates of Lower Extremity Injury on Synthetic Turf Compared With Natural Turf Among National Football League Athletes: Epidemiologic Confirmation of a Biomechanical Hypothesis. Investigation performed at IQVIA, Research Triangle Park, North Carolina, USA. The authors are as follows: Christina D. Mack, PhD, MSPH, Elliott B. Hershman, MD, Robert B. Anderson, MD, Michael J. Coughlin, MD, Andrew S. McNitt, PhD, Rachel R. Sendor, MPH, and Richard W. Kent, PhD. This study appears in The American Journal of Sports Medicine, 2019;47(1): 189-196, DOI: 10.1177/0363546518808499.

