

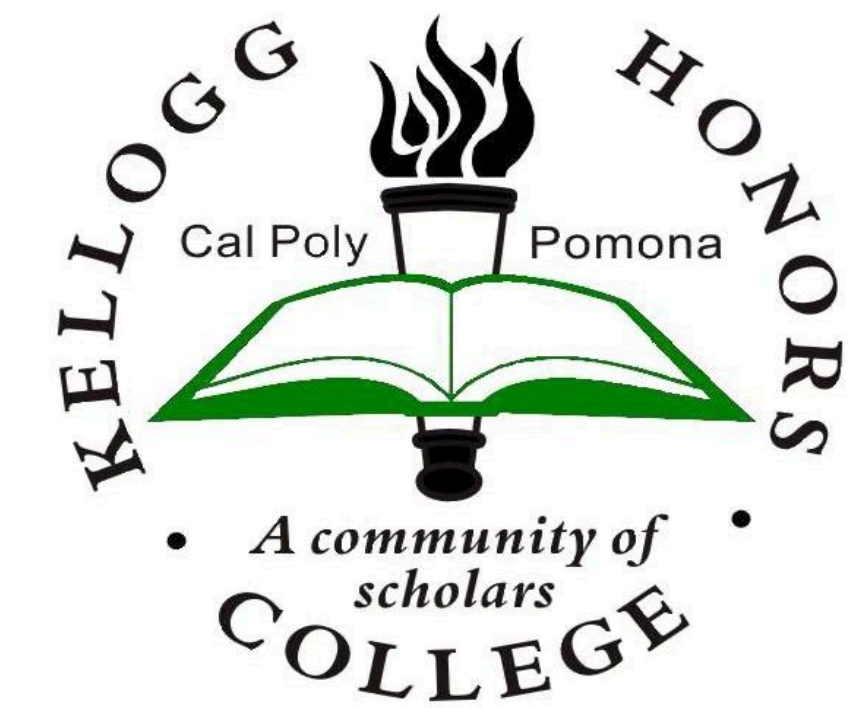
The Effects of Third-generation Artificial Turf versus Natural Grass on Lower Extremity Injury Rates Amongst Field-Playing Athletes



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BACKGROUND

In recent years, the use of artificial turf for field-playing sports has become extremely prevalent. The decision to use artificial turf opposed to natural grass is driven by its ease of maintenance, excellent durability and multiuse capabilities. The synthetic grass used today is known as, third-generation artificial turf. There are key distinctions that help classify third-generation artificial turf. These distinctions include longer fibers that are spaced further apart than before, allowing for the cleat to drive better into the surface. Additionally, the fibers are now made of polyethylene making it softer on the skin of athletes. Lastly, the infill is a combination of sand and rubber creating better stability and cushion for the athletes. These additions are thought to drastically improve the performance and safety of artificial turf. Although, performance on both surfaces are now comparable, recent surges in injuries questions the level of safety. **PURPOSE:** Our question for this systematic review, is if playing on a third-generation artificial turf surface versus a natural grass surface is associated with higher lower extremity injury rates amongst field-playing athletes. This systematic review focuses on studies that address the difference in lower extremity injury rates of artificial and natural surfaces. The data collected allows for a comparison of the effects from the type of playing surface

METHODOLOGY

Due to the circumstances, this project was done as a systematic review. A systematic keyword search was performed of the PubMed, Sports Medicine and Education Index and ProQuest databases. These keywords included: turf, natural grass, injury, field-playing and athletes. By including these key words, our search results were then narrowed to thirty-four articles. Then, we narrowed the results to articles that compared 3rd generation artificial turf versus natural grass. This took our results down to eighteen articles. The articles reflected competition levels from high school, college and professional. Lastly, we eliminated any articles that were not lower extremity focused. Our final group contained thirteen articles, 7 focused on soccer and 6 focused on football. We ran the injury rates on artificial turf compared to natural grass for each study. The injury rates were based on athlete's exposure to the surface. Comparing the rates from the two surfaces, we were able to see if there was a significant difference between the injury rates.

RESULTS

Article	Clinical Inference
Bjorneboe et al. (Soccer)	No significant differences were detected
Bianco et al. (Soccer)	Does not seem to contribute
Dodson et al. (Football)	No correlation between playing surfaces and ACL injury rates
Dragoo et al. (Football)	3 rd generation Artificial Turf does not add to increases in injury rates
Ekstrand et al. (Soccer)	No significant differences were detected
Ekstrand et al. (Soccer)	No evidence of greater risk comparing Natural grass and Artificial Turf
Hershman et al. (Football)	Higher rates in ankle and knee sprains on Artificial Turf
Howard et al. (Soccer)	No difference in risk of ACL injury was detected
Kordi et al. (Soccer)	Injuries on Natural grass higher than Artificial Turf
Loughran et al. (Football)	Artificial Turf is an important risk factor for specific knee ligament injuries
Mack et al. (Football)	Artificial Turf resulted in 16% more injuries than Natural grass
Meyers et al. (Football)	Grass and Artificial Turf injury rates exhibited unique injury rates that warrant further investigation
Steffen et al. (Soccer)	Injury rates were similar between Natural grass and Artificial Turf

Eight out of the thirteen articles resulted in no significant difference among the two playing surfaces. The remaining studies produced mixed conclusions. Dragoo et al. showed that natural grass (NG) had an injury rate of 0.36 whereas Artificial Turf (AT) had 0.33. This showed that there were not increase in injury among Artificial turf. Hershman et al. revealed there were higher rates in ankle and knee sprains on AT. AT had an injury rate of 0.33 for knee sprains and 0.32 for ankle sprains. NG had an injury rate of 0.27 for knee sprains and 0.26 for ankle sprains. Kordi et al. showed that NG play resulted in more injuries. The injury rate for NG was .89 and the injury rate for AT was .65. Loughran et al. showed that on NG the injury rate was 0.11 for knee injuries. The injury rate on AT was 0.33 for knee injuries. Mack et al. showed that NG had an injury rate of 0.16 and AT had an injury rate of 0.14. Meyers et al. showed unique injury rates that were dissimilar to the other studies. These results warrant further investigation.

CONCLUSION

This study was done because in recent years the use of Artificial Turf has grown. With the growing prevalence, it is important to verify the safety of Artificial Turf for its field-playing athletes. However, this systematic review has shown that there are conflicting injury rates when comparing the two surfaces. The injury rates show that for soccer the injury rates for Artificial Turf and Natural grass are very similar. Football requires more investigation to see the full effects of Artificial Turf on injury rates. Injury rates rely on playing surface, sport and environmental conditions. All these factors make it hard to derive definite conclusions about the safety of the playing surfaces. Because of the multiple factors and differing results, it is concluded that more studies need to be done to clarify the conflicting data.