

Research on products such as artificial turf is potentially exposed to the same types of industry bias as research on pharmaceuticals

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Imagine your surprise if you were walking through a gardening store and saw a packet of perennial ryegrass seed with the following notification label: "This product has been specifically designed to provide the safest playing surface for football and to protect the knees of young athletes." Interestingly, there are scientific data to back up that claim.¹ The surprise would come because such a claim would be unexpected. Nobody owns a patent for ryegrass (*Lolium perenne* is a naturally occurring species), and so there is little commercial benefit in lobbying to claim that it is a safer product.

FIELDTURF AND DEFINITION OF 'INDEPENDENT' STUDY

By contrast, it is not much of a surprise to click on a webpage such as <http://www.fieldturf.com/en/fieldturf-difference/proven-safety> and find claims that a proprietary artificial turf system reduces injuries. A for-profit company is very interested in promoting scientific data which suggest that their product reduces injury and is equally interested in arguing against any data otherwise. On the FieldTurf 'Proven safety' webpage, data are presented from two studies that claim to be 'independent' and purport to show the superior safety record of the product compared to natural grass.²⁻³ The webpage does not mention that FieldTurf funded both these 'independent' studies. This does not imply that the data from these studies are incorrect, but that the study should be read in the context that it is actually *not* independent and therefore potentially not free from bias. FieldTurf are using the term 'independent' on their website to mean that they did not conduct the studies themselves, but the fact that they funded them means that they are not 'independent' in the scientific sense.

The webpage also does not make any mention of conflicting studies, many of which were independent of industry funding.⁴⁻⁵ One of these examined

anterior cruciate ligament (ACL) and other lower limb injury rates in the NFL on FieldTurf compared to natural grass⁵; the rates on FieldTurf were significantly higher. Spokesmen from FieldTurf responded to the initial release of the NFL data claiming that it was 'not a real study', 'unfortunate' and that the 'methods were faulty'.⁶ Their conclusion was that 'the safety of the athletes really is in our DNA' and that a study suggesting circumstances in which FieldTurf may lead to higher injury rates must therefore be faulty, as they had funded research suggesting the opposite.

Finally, the FieldTurf webpage claims that their product has the 'best traction', without stating what this means. It has long been recognised that 'high' traction is preferred by players for performance reasons, but the trade-off may be higher injury rates.⁷⁻⁹

NEW DATA RAISE QUESTIONS ABOUT THE SAFETY OF NEW GENERATION TURF

This issue of *BJSM* contains two additional studies¹⁰⁻¹¹ that cast doubt on whether new generation artificial turf is safe in all circumstances. One of these¹⁰ adds to a growing evidence base that new generation artificial turf leads to higher risk of injury in American football. The other¹¹ concerns soccer teams in northern Europe, where previous studies have generally found no excess of match injuries when artificial turf is used.¹² This new study¹¹ reports a higher overall injury rate (including those of gradual onset) in teams whose home venue used artificial turf, even though there was no significant difference between surfaces for match onset injury. Another recent study showing a correlation of high rotational traction and increased injury risk¹³ shows the dilemma for all surfaces trying to achieve the best (? highest) rotational traction for performance without increasing the risk of injuries. If the artificial turf companies stay true to form, then these studies may also get tainted with criticism that they are 'flawed' and/or not

representative of the inherent safety of their particular product. Of course, all studies have limitations and are open to criticism. With the rapid increase in publications on the topic, it would be an appropriate time for a Cochrane (or similar) review of the risk of new generation artificial turf, although an almost certain finding of such a review would be that firm conclusions are difficult to make because of the (unmeasured) day-to-day and individual-to-individual variations in shoe-surface traction that presumably underpin injury risk on a given surface.

TAKING THE BAD WITH THE GOOD OF NEW GENERATION ARTIFICIAL TURF

I think an appropriate analogy for a company like FieldTurf is 'Big Pharma'. We do not consider that the major pharmaceutical companies are 'bad' in the way we think of the big tobacco companies— after all, pharmaceutical companies fund life-saving medications and have been responsible for far more public good than bad. However, publicly listed companies are legislatively bound to commit to return on shareholder investment, so they are clearly unable to independently assess the safety and efficacy of their products. It is recognised that a strong regulatory framework is needed to keep Big Pharma in check and that, in particular, we should be careful in assessing funded research as the gold standard. New generation artificial turf is a great innovation, particularly for lowering the cost of playing sport in climates where natural grass is hard to maintain. However, in climates where natural grass is far easier to maintain, we should encourage an environment where injury outcomes are considered in the decision about whether to switch to an artificial surface (not considering only those studies in an artificial turf company's marketing material).

TIME FOR STRICTER SAFETY REGULATION OF THE TURF INDUSTRY

In sports medicine, we currently lack the regulatory framework to insist that companies like FieldTurf present a balanced view of the published safety studies when marketing their product. Natural grass surfaces do not have the same industry lobbying to influence decisions about which surface to lay on a sporting field. Most importantly, there is usually a complete disconnect between the body funding the installation and maintenance of a sporting field and the bodies paying the costs of sporting injuries. If a school or university can save money over time with an artificial turf installation, it will not feel compelled to take into account

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the costs of injuries that it does not bear. This disconnect exists even in the one country of the world, New Zealand, with a good infrastructure set-up to measure the costs of all sporting injuries.¹⁴

SPORTS SAFETY IS AN IMPORTANT PART OF PHYSICAL ACTIVITY PROMOTION

Sadly, it is all part of a bigger disconnect. Sports injuries lead to physical inactivity, which is the greatest preventable risk factor for general health problems in developed societies.¹⁵ Governments all over the world have not yet made the connection between sports injury prevention, physical activity promotion and improvements in population health. If there are circumstances (eg, hot weather) in which new generation artificial turf leads to higher sports injury rates (such as ACL injuries), they would actually threaten the future general health of the segment of the population that bore the excess injury cost. To be fair, sporting organisations that promote physical activity also do not currently achieve government funding proportional to future saving for the health system by reducing inactivity. These are the connections that need to be made for societies to get greater uptake of safer physical activity.

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