3.4 Risk of Injury on Artificial Turf

Why we conducted these studies

Football has traditionally been played on natural grass. However, artificial turf has become more and more popular with an increasing number of pitches being built especially in countries where the climatic conditions are unsuitable for the installation and maintenance of grass pitches. In 2006, FIFA had approved the use of artificial turf for all matches. In addition to match play issues, artificial turf provides a year-round, all-weather training surface. Still, acceptance of artificial turf by players had remained limited because of a continuing perception of a different pattern of injury and, even more important, an increased injury risk when playing on artificial surfaces.

Before FIFA as the world governing body could widely promote artificial surface, the football community needed proof that these new products are no different from grass in terms of injury risk. Preliminary data from the FIFA U-17 World Cups in 2003 and 2005 had suggested no significant difference in the incidence, nature, cause and severity of injuries sustained on grass and artificial turf, but the study had been too small for definite conclusions. Therefore, it was decided to perform two separate studies on the incidence of training and match injuries on artificial turf as compared to grass with sufficient power for a greater depth of analysis than what had been achieved so far.

Aims of the studies

- Compare the incidence, nature, severity and cause of match injuries sustained on grass and new generation artificial turf by American collegiate male and female football players
- Compare the incidence, nature, severity and cause of training injuries sustained on grass and new generation artificial turf by American collegiate male and female football players

How we collected the data

In the US, the governing body of American college sports (NCAA) conducts annual injury surveys of all sports from a selected sample of American universities. The studies were conducted over two seasons for 52 men’s teams and 64 women’s teams (in 2005) and 54 men’s teams and 72 women’s teams (in 2006). The study on match injuries included all organised matches from preseason, in-season and post-season football competitions while the study on training injuries included all organised practice sessions from preseason, in-season and post-season. The trainers or health professions from each football team were required to submit detailed injury reports on a regular basis according to the specific requirements of the NCAA. Injuries were defined as “any physical complaint sustained by a player that prevented the player from taking a full part in training or match play activities for one or more days.” Details on the playing surface and the location, diagnosis, severity and cause of all match injuries were also recorded. The number of days lost from training and match play was used to define the severity of an injury. The incidence of injury was documented per 1000 player match or training hours.

Results

The main findings of these two studies were that there were no major differences in either the risk or the cause of training or match injuries on artificial turf and grass in both male and female football players. Neither did the severity nor the causes of injury differ significantly on artificial turf and grass in both genders. In both match and training the most common injury location on artificial turf and grass was the lower limb in both men and women.

For grass, we analysed three to four times more match and training hours than for artificial turf, which accounts for the difference in injury numbers recorded. The total match injuries were 848 for men (artificial turf: 183, grass: 665) and 946 for women (artificial turf: 134, grass: 812). The injury rate on grass for male (23.92) and female (21.79) players per 1000 match injuries was similar to previous findings and there were no differences in match injuries as compared to artificial turf for men (25.43 injuries/1000 match hours) or for females (19.15 injuries per 1000 match hours, Tab. 3.4.1). There were also no surface related differences for non-season ending time loss injuries. The most common injuries for men during matches were a lateral ankle sprain, hamstring strain and concussion. For women, the most common injuries were a lateral ankle sprain, concussion, and ACL tear.
For training, again, we analysed three to four times more teams on grass. There were a total of 818 injuries to men (artificial turf: 189 grass: 629) and 774 injuries to women (artificial turf: 122, grass: 652). Similarly to the findings during matches, there were no differences in training injuries for males on artificial turf vs. grass (3.34 vs. 3.01 injuries/1000 training hours respectively) or for females (2.60 vs. 2.79 injuries per 1000 training hours respectively). The most common training injuries in men were a lateral ankle sprain, groin strain and quadriceps or hamstring strain. The most common training injuries in women were a lateral ankle sprain, quadriceps or hamstring strain and concussion.

<table>
<thead>
<tr>
<th>Play setting</th>
<th>Match Females</th>
<th>Match Males</th>
<th>Training Females</th>
<th>Training Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass</td>
<td>21.79</td>
<td>23.92</td>
<td>2.79</td>
<td>3.01</td>
</tr>
<tr>
<td>Artificial turf</td>
<td>19.15</td>
<td>25.43</td>
<td>2.60</td>
<td>3.34</td>
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</tbody>
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Tab. 3.4.1 Overall injury rates (per 1000 player hours) by gender, play setting

The players investigated in these studies provided an ideal setting to compare the risks of injury on new generation artificial turf and grass. Because of the large number of players, the results can be considered as representative. For women in particular, there were no equivalent data available so far indicating the injury incidence on artificial turf. Further, the adequate statistical power of the studies for the first time allowed to analyse injury subcategories to a greater depth. The most important result from these studies was the lack of any overall difference in the risk of acute injuries between play on artificial turf and natural grass in male and female players. There were generally no differences between the overall incidence, severity, nature or cause of match or training injuries sustained on artificial turf and grass.

**What we learned from these studies**

**Duration:** 2005 - 2007  
**Countries:** England, USA  
**Cooperations:** University of Nottingham, UK; National Collegiate Athletic Association, USA  
**References:**  