

## Profiling of Injury Risks on the Usage of Natural Grass and Synthetic Grass Grounds towards Football and Futsal Players

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### Abstract

In these recent years, the injury risks among football and futsal players are increasing. Various types of injuries need to be deal with by the players; among others are legs, knees, ankles and feet injuries. The types of ground play an important role because the structure and type of grass give huge impact to the players if they trip over or fall. This research is aimed to study the risks of injuries among these football and futsal players when they perform on synthetic grass and natural grass grounds. Surveys were done based on the questionnaires prepared. It is hoped that this research could assist the players, related associations and service providers to review on the maintenance methods on both grounds and make comparisons on the types of injuries that will be experienced by the players during their performance on the selected grounds. The population of this study comprised of football and futsal clubs in Klang Valley. Comparisons on the types on injuries were made among football and futsal players. This research is expected identify the types injuries that is encountered by the players and to gather as many related information on the injuries.

### Introduction

Sports injuries are resulted from interactions of many factors related to the participants and also the environment. The environment factor is known as extrinsic risk factors. Ground conditions such as the types of grass is one of the extrinsic risk factors and would influence risk injuries, especially on the types of sports that involve running or activities on turf surfaces. Any risk management approach to assess the suitable grounds for sporting activities must take into consideration the environmental factors.

These days, the risks of injuries among football and futsal players are increasing. Players need to deal with a number of injuries such as knee and ankle injuries. The types of ground condition such as grass types play an essential role on the safety and performance of the players (Soligard *et al.*, 2010). Traditionally, football is being played on natural grass ground. However, with the introduction on synthetic grass, the landscape of football tournaments has been changed. Synthetic grass is believed to be cheaper, cost effective, allow longer playing time and easy to maintain. This synthetic grass was introduced in 1970's. The first generation of synthetic grass football ground was quite rough and not player friendly (Engerbertsen & Kane, 1987). Meanwhile, later, improvements on the grasses were made and the structure of the grass became softer and did not cause severe pain to the players when they tripped over, slid or fall.

Nevertheless, from the previous findings, there was an impact on the usage of synthetic grass ground among the football players. Most injuries occurred to players when they perform on synthetic grass ground compared to natural grass ground. Therefore, this is an important issue to look at whereby information could be disseminate to all on the comparison of injury risks when players perform on different types of grass grounds. The outcome of the research is expected to assist in providing the right information regarding types of injuries to the players. Besides that, this research could also support the service providers to be more sensitive towards the synthetic grass ground maintenance issues. Moreover, football and futsal coaches will have clearer view on choosing the right playing ground towards ensuring the player's safety. Conclusively, comparison on the types of injuries on synthetic and natural grass grounds could be determined. In this present study, the main objective of this research is to identify the risks of injuries on natural grass and synthetic grass ground among football and futsal players.

### **Methodology**

This research involved questionnaires related to risks of injuries on natural and synthetic grass grounds. Questionnaires were distributed to football and futsal associations and clubs around Klang Valley. All respondents were briefed earlier on the research that will be done.

### **Results and Discussion**

The research involved 234 respondents. The respondents comprised of male and female football and futsal players with various years of playing experience. Based on the findings (Table 1), the highest type of injuries experienced by the football players was knee injury with 18%, followed by ankle (16%), upper leg (14%), (shoulder/elbow (11%), shin/calf (9%), foot/toe (9%), head/face/neck (7%) and abdomen (7%). Meanwhile, for futsal players, the highest type of injury reported was ankle injury (15%), followed by upper leg (14%), foot toe (12%), head/face/neck (11%), shoulder/elbow (11%), shin/calf (10%), hip/groin (10%), abdomen (10%) and knee injury (7%).

The findings reported that, the highest head/face/neck injury among football players was concussion with 49% and the lowest injury was fracture (7%). In the meantime, the highest head/neck/face injury among futsal players was sprains (54%) and the lowest reported was contusions (8%). Specifically, for shoulder and elbow injury, Muscle-tendon sprain was reported to be highest among both football and futsal players. While acromioclavicular (AC) sprains was reported the lowest (7%) among football players and fractures was the lowest among futsal players (0%). The highest injury for hip and groin was groin pull/strain for both

football (88%) and futsal players (80%), as compared to the lowest injury reported for hip and groin, Adductor tendinopathy with 12% and 20% for football and futsal players respectively. As for ankle injuries, sprain was the highest injury experienced by both football and futsal players compared to other types of injuries. The lowest ankle injury experienced by football players was contusions with 1% injury.

Meanwhile, futsal players experienced Achilles tendon rupture with 4% injury. The other type of injuries experienced by these players is foot and toe injuries. Strain is again, the most common foot and toe injuries among football and futsal players with 53% and 72% respectively. In the meantime, fracture was the lowest reported with 21% by football players and 11% by futsal players. Finally, strain was also common injury in abdomen area for both football and futsal players with 57% and 55% respectively. This study reported that laceration was the lowest abdominal injury among football players with 10% and contusions and lacerations were both the lowest injury among futsal players with 12%.

Table 1

*Types of injuries experienced by football players (natural grass ground) and futsal players (synthetic grass ground)*

Type of Injuries	Frequency of Injuries			
	Football		Futsal	
	Total	Percentage	Total	Percentage
<b>Head/Face/Neck</b>	<b>61</b>	<b>7%</b>	<b>50</b>	<b>11%</b>
Concussion	30	49%	14	28%
Sprains	14	23%	27	54%
Fractures	4	7%	5	10%
Contusions	13	21%	4	8%
<b>Shoulder/elbow</b>	<b>86</b>	<b>11%</b>	<b>48</b>	<b>11%</b>
Dislocations	21	24%	14	29%
Fractures	9	11%	0	0%
Acromioclavicular (AC) sprains	6	7%	1	2%
Elbow ulnar collateral ligament (UCL)	7	8%	3	6%
Rotator cuff tears/sprains	8	9%	4	9%
Muscle-tendon strain	35	41%	26	54%
<b>Knee</b>	<b>146</b>	<b>18%</b>	<b>31</b>	<b>7%</b>
Anterior cruciate ligament (ACL)	38	26%	18	27%
Posterior cruciate ligament (PCL)	16	11%	4	6%
Medial collateral ligament (MCL)	10	7%	3	5%
Lateral collateral ligament (LCL)	12	8%	3	4%
Meniscus Tears	22	15%	8	12%
Sprains	34	23%	25	37%
Tendonitis	9	6%	3	4%
Patellofemoral pain syndrome	3	2%	2	3%
Iliotibial band (ITB) syndrome	2	2%	1	2%
<b>Leg (upper leg)</b>	<b>113</b>	<b>14%</b>	<b>64</b>	<b>14%</b>

Hamstring strains	63	56%	34	53%
Quadriceps strains	18	16%	9	14%
Thigh strains	32	28%	21	33%
<b>Hip/Groin</b>	<b>74</b>	<b>9%</b>	<b>44</b>	<b>10%</b>
Groin pull/strain	68	88%	35	80%
Adductor Tendinopathy	9	12%	9	20%
<b>Ankle</b>	<b>132</b>	<b>16%</b>	<b>68</b>	<b>15%</b>
Sprains	76	58%	46	68%
Fractures	12	9%	4	6%
Achilles tendonitis	14	11%	4	6%
Ankle impingement	21	16%	8	12%
Achilles tendon rupture	7	5%	3	4%
Contusions	2	1%	3	4%
<b>Shin/Calf</b>	<b>76</b>	<b>9%</b>	<b>44</b>	<b>10%</b>
Calf muscle tear	18	24%	9	20%
Shin splints	29	38%	6	14%
Fractures	5	7%	4	9%
Calf muscle strain	24	31%	25	57%
<b>Foot/toe</b>	<b>70</b>	<b>9%</b>	<b>53</b>	<b>12%</b>
Fractures	15	21%	6	11%
Plantar fasciitis	18	26%	9	17%
Strain	37	53%	38	72%
<b>Trunk/ abdomen</b>	<b>61</b>	<b>7%</b>	<b>42</b>	<b>10%</b>
Contusions	10	17%	5	12%
Lacerations	6	10%	9	21%
Herniations	10	16%	5	12%
Strain	35	57%	23	55%

According to Fuller *et al* (2007), over half of all injuries reported among football and futsal players were of lower extremity injuries, specifically knee or ankle injuries. It was also reported that lower extremity injuries occurred on synthetic surfaces compared to natural surfaces. However, a study by Fuller *et al* (2010) reported that there was no significant difference in the risk of rugby players injuries on synthetic turf compared to natural grass. By its nature, football and futsal is physical and dangerous because of the size, speed and strength of the players colliding with each other. In comparison with other types of sports, football is consistently noted as being high-risked (Clanton, 1994). Athletes experience a variety of injuries from head to toe (Wolfel *et al.*, 2003). For each type of sports, there are certain injuries that are common than others. However, ankles and knees injuries are the most common among all sports (Fernandez *et al.*, 2007). In football and futsal, ankle, knee and thigh structures were the most frequently injured among players (Fuller *et al.*, 2007). Over the past years, several studies have been conducted to compare injury rates between natural and synthetic grass grounds. However, until today, there is still conflict, which type of

grass ground is safer. Orchard (2002) found that the injuries among football players were higher on synthetic grass. This finding was also in line with (Powell & Schootman, 1992; Hagel *et al.*, 2003). Accordingly, there exists an interaction between performance and risk of injury with synthetic grass ground. Synthetic grass ground is suspected to increase the athlete's speed, acceleration and torque while playing, but this can eventually lead to more injuries (Meyers & Barnhill, 2004). Surface characteristics of natural and synthetic grass grounds are quite variable, although synthetic grass is harder than natural grass. When analysed by weather condition, the risk of injury did not vary significantly with weather in indoor games on synthetic grass. However, cool and wet conditions on natural grass and cool and dry condition and synthetic grass in outdoor stadiums were associated with lower injury rates of ankle and knee injuries (Meyers, 2010).

### **Conclusion**

Football and futsal are the two types of field sports that are being most favourable around the world. Injuries among players are common in these sports. In the present study, the most common injuries experienced by football and futsal players were identified. Apart from that, from this research, prevention measures could be taken in order to avoid injuries among players. These injuries could be related on the types of ground surface used. Therefore, a proper physical exercise programmes for football and futsal players need to be practiced in order to strengthen certain muscles that are prone to experience injuries. The knowledge in injuries recovery and healing among players and coaches is very important in aid of the recovery process after a certain injury.

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