A prospective epidemiological study of injury incidence and injury patterns in a Hong Kong male professional football league during the competitive season

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Abstract

The aim of this study was to investigate the match and training injury incidence, injury patterns and severity, and their monthly variation in a Hong Kong male professional football league. The study design was a prospective cohort study. Seven teams in the Hong Kong Football Association first division league and 152 players from 10 professional teams participated in this study. On a weekly basis throughout the 9-month season, time-loss injuries and individual exposure were collected from injury recorders team visits. Operational injury definitions and procedures followed the recommendations of a football consensus. The overall injury incidence was 7.4 injuries/1000 player hours and 296 injuries were recorded. The relative risk of match injury was 17 times greater than the risk of training injury (relative ratio (RR), 17.3; 95% confidence interval (CI), 11.6–25.7; p < 0.001). Ankle sprain was the most common injury type (16.2% of all injuries) and 52% of these injuries were recurrent. Thigh strain was the second most common injury type with 82% of the injuries involving the hamstring muscle and 80% of hamstring strains were noncontact injuries. During the competitive season, the relative risk of injury was highest in October (RR, 6.8; 95% CI, 6.7–6.9; p < 0.001) and February (RR, 4.7; 95% CI, 4.3–5.2; p < 0.001). This highlighted that Hong Kong professional football has a high match injury incidence. The relative risk of injury was highest at the beginning of the competitive season. A prospective multicentre epidemiological study is warranted to examine regional differences in injury risks. Coaches, players, health professionals, and researchers should join their efforts to investigate the effect on injury incidence and injury pattern associated with the duration and content of the preseason period, and the number of friendly matches held during preseason.

Keywords: epidemiology; injury patterns; injury risk; male; professional football

Introduction

According to the Fédération Internationale de Football Association (FIFA), 265 million male players actively participate in Association football worldwide and a 21% increase in participation has occurred during the past decade. Despite the popularity of the sport, Association football is associated with a high risk of injury (e.g., the injury incidence in male professional football ranges 8–14.4 injuries per 1000 player hours).1–5

Implementing a sports injury surveillance system may be the first step in identifying the injury incidence and patterns, which would then help in developing evidence-based injury prevention measures.6 A previous study adopted this model and developed a preventive exercise program (e.g., Nordic
hamstring exercise to reduce the risk of new and recurrent hamstring strain injury in elite soccer players.\textsuperscript{3} In the past decade, football injury epidemiological studies have been performed in different parts of the world at the senior male elite level and included leagues in England,\textsuperscript{3,4} Sweden,\textsuperscript{5} France,\textsuperscript{6} Iceland,\textsuperscript{9} and Norway,\textsuperscript{10,11} and included international tournaments\textsuperscript{12–15} and leagues.\textsuperscript{1} In a previous epidemiological study,\textsuperscript{5} differences in injury risks between Swedish and Danish top leagues were observed. A higher incidence of training injury and match injury was recorded in Danish players (11.8 injuries and 28.2 injuries, respectively, per 1000 player hours), compared to Swedish players (6.0 injuries and 26.2 injuries, respectively, per 1000 player hours). Another regional difference was found at the highest competitive league level.\textsuperscript{1} English and Dutch teams showed a significantly higher risk of match injury and major injury, compared to teams from Mediterranean regions (e.g., Spain and France). The frequency of training sessions and matches, playing surface condition and weather, and level of play may contribute to this discrepancy.\textsuperscript{2} Data were scarce from other regions such as Africa and Asia. To the knowledge of the authors, only two studies have addressed the risk of injury during play in an Asian league and in a tournament.\textsuperscript{14,16} Investigation of the domestic football league in Asia is rare.

This study is the first in Asia to prospectively investigate the incidence of injury and monthly variation in the injury rate in a male domestic football league. This study aims to provide future insight and guidance for clinicians, scientists, and coaches managing football injuries, and to develop specific injury prevention measures for leagues at different competition levels.

Materials and methods

Study period and participants

A prospective study of Hong Kong male professional football players was performed through the 2010–2011 season. All teams were invited, and seven of 10 teams in the first division league—which totalled 152 first team players—participated in this study. These teams had daily soccer training and 1–2 weekly official matches. The competitive season was from September 2010 to May 2011. All procedures in this study were approved by the University Clinical Research Ethical Review Committee of the Chinese University of Hong Kong (Hong Kong, China) and were conducted in accordance with the ethical standards of the Declaration of Helsinki (Reference number: CRE-2010.412).\textsuperscript{17}

Data collection

This study design followed the consensus on injury definitions and data collection procedures in studies of football injuries, as outlined by FIFA.\textsuperscript{18} Demographic information such as height, weight, and age were collected during the last week of the preseason period (which was before the start of the season). In a briefing session, the definition of injury types and the data collection procedure were explained and introduced to each team before the first official match of the season. Team physicians, coaches, players, and club administrative personnel were invited to participate and all participants provided signed written consent during the session. Injury recorders visited each team on a weekly basis. Individual player exposure for trainings and matches were registered by coaches using a standard exposure form.\textsuperscript{19} Injury records were completed by injury recorders using a standardised injury report form. All injury recorders were physiotherapists and athletic trainers and were required to attend a familiarisation session on the report form and the definition of each injury.

Definitions

The operational definitions adopted by this study, which are shown in Table 1, have been widely adopted in football epidemiological studies.\textsuperscript{1,2,5,12} All injuries which hinder the player from full participation in training or match play (i.e., time-loss injuries) were recorded. The day on which an injury occurred was Day 0 and was not counted when determining the severity of an injury. The injuries were checked by team physiotherapist or injury recorders for minimal and mild injury cases. Moderate and severe injuries were checked by an orthopaedic specialist and were diagnosed by clinical tests and medical imaging, if necessary. All injuries were followed until the final day of rehabilitation. “Total match exposure” is equal

<table>
<thead>
<tr>
<th>Table 1 Operational definitions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reportable injury</td>
</tr>
<tr>
<td>Player</td>
</tr>
<tr>
<td>Return to participation</td>
</tr>
<tr>
<td>Type of injury</td>
</tr>
<tr>
<td>Acute</td>
</tr>
<tr>
<td>Overuse</td>
</tr>
<tr>
<td>Reinjury</td>
</tr>
<tr>
<td>Severity of injury</td>
</tr>
<tr>
<td>Minimal injuries</td>
</tr>
<tr>
<td>Mild injuries</td>
</tr>
<tr>
<td>Moderate injuries</td>
</tr>
<tr>
<td>Severe injuries</td>
</tr>
<tr>
<td>Exposure</td>
</tr>
<tr>
<td>Injury incidence</td>
</tr>
</tbody>
</table>
to the sum of individual player match playing times, and “training exposure” is equal to the sum of individual player training time.

Statistical analyses

The computer-based software SPSS (version 16.0, SPSS Inc., Chicago, IL, USA) was used for statistical analysis. The overall injury incidence, match injury incidence, and training injury incidence were the number of injuries divided by 1000 player-hours in total, match, and training, respectively, using the exposure time of each individual player. The results are expressed as the mean ± the standard deviation for continuous data and counts, and as percentages for categorical variables. A multivariate Poisson regression model was used to estimate the change in injury incidence over the study on a monthly basis. The injury incidence was the dependent variable; the month (t = 9) and event (i.e., match or training) were the independent variables. The relative ratio (RR) was presented with training injury as the reference group. The significant level was set at p ≤ 0.05. Chi-square statistics was used to compare the proportion of new and reinjury over the study period.

Results

Exposure and risk of injury

During the season, five players dropped out because of transfers to a club that was out of the surveillance system; their injury data were included, based on their participation time. Table 2 shows the detailed injury incidence and exposure data. The total exposure of the 152 players was 39,768.50 hours (age, 25.0 ± 4.3 years; height, 177.7 ± 4.7 cm; and weight, 72.5 ± 5.6 kg). Throughout the 2010–2011 season, 296 injuries were recorded. More than 80% (122/152) of players sustained at least one injury in the season. The overall injury incidence, match injury incidence, and training injury incidence were 7.4 injuries, 61.1 injuries, and 3.4 injuries, respectively, per 1000 player hours. The risk of injuries was higher for match play (at 25.0 ± 72.5 month (t = 8)); the change in injury incidence over the study period.

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Table 2

Incidence and exposure data in Hong Kong professional football players.

<table>
<thead>
<tr>
<th>Training sessions</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of training sessions per player</td>
<td>162 (32)</td>
</tr>
<tr>
<td>Training hours per player</td>
<td>243 (35)</td>
</tr>
<tr>
<td>Training injury incidence (injuries per 1000 player hours)</td>
<td>3.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Matches</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of matches per player</td>
<td>24 (3)</td>
</tr>
<tr>
<td>Match hours per player</td>
<td>19 (8)</td>
</tr>
<tr>
<td>Match injury incidence (injuries per 1000 player hours)</td>
<td>61.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total exposure hours per player</td>
<td>262 (64)</td>
</tr>
<tr>
<td>Overall injury incidence (injuries per 1000 player hours)</td>
<td>7.4</td>
</tr>
</tbody>
</table>

SD = standard deviation.

Injury pattern and severity of injuries

Table 3 shows the injury location, type, and pattern. Eighty-three percent (246/296) of injuries affected the lower extremities. The most common injury locations were the ankle (16%), the thigh (15%), and the lower legs (15%). The most common injury types were contusion (30%), muscle strain (29%), and ligamentous sprain (28%), which accounted for approximately 90% of the overall injuries. Common injury types were ankle sprain (48/296), thigh strain (33/296), and groin/adductor strain (30/296). The injury

Table 3

Injury characteristics by severity.

<table>
<thead>
<tr>
<th>Injury location</th>
<th>&lt;4 days</th>
<th>4–7 days</th>
<th>8–28 days</th>
<th>&gt;28 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head/forehead</td>
<td>5 (2)</td>
<td>4 (2)</td>
<td>1 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Arm/upper limb</td>
<td>2 (1)</td>
<td>1 (1)</td>
<td>1 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Shoulder/clavicle</td>
<td>14 (5)</td>
<td>9 (5)</td>
<td>2 (5)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Upper arm</td>
<td>1</td>
<td>1 (1)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Elbow/forearm</td>
<td>3 (1)</td>
<td>2 (1)</td>
<td>0</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Wrist</td>
<td>5 (2)</td>
<td>3 (2)</td>
<td>1 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Finger/thumb</td>
<td>5 (2)</td>
<td>2 (1)</td>
<td>2 (5)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Hand</td>
<td>3 (1)</td>
<td>1 (1)</td>
<td>1 (2)</td>
<td>0</td>
</tr>
<tr>
<td>Sternum/ribs/upper back</td>
<td>4 (1)</td>
<td>3 (2)</td>
<td>0</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Abdomen</td>
<td>2 (1)</td>
<td>1 (1)</td>
<td>0</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Hipgroin/adductor</td>
<td>35 (12)</td>
<td>21 (12)</td>
<td>5 (12)</td>
<td>8 (15)</td>
</tr>
<tr>
<td>Thigh/hamstrings/ quadriceps</td>
<td>44 (15)</td>
<td>21 (12)</td>
<td>8 (20)</td>
<td>12 (22)</td>
</tr>
<tr>
<td>Knee</td>
<td>35 (12)</td>
<td>13 (7)</td>
<td>3 (7)</td>
<td>12 (22)</td>
</tr>
<tr>
<td>Lower leg/Achilles tendon</td>
<td>43 (15)</td>
<td>18 (11)</td>
<td>5 (12)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Ankle</td>
<td>48 (16)</td>
<td>34 (19)</td>
<td>6 (15)</td>
<td>7 (13)</td>
</tr>
<tr>
<td>Foot</td>
<td>23 (8)</td>
<td>18 (10)</td>
<td>2 (5)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Toe</td>
<td>18 (6)</td>
<td>8 (4)</td>
<td>4 (10)</td>
<td>4 (7)</td>
</tr>
<tr>
<td>Injury type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fracture</td>
<td>7 (2)</td>
<td>1 (1)</td>
<td>1 (2)</td>
<td>4 (19)</td>
</tr>
<tr>
<td>Dislocation/ subluxation</td>
<td>2 (1)</td>
<td>0</td>
<td>1 (2)</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Ligamentous sprain</td>
<td>84 (28)</td>
<td>51 (28)</td>
<td>10 (24)</td>
<td>17 (31)</td>
</tr>
<tr>
<td>Meniscus/cartilage</td>
<td>3 (1)</td>
<td>0</td>
<td>0</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Muscle strain</td>
<td>85 (29)</td>
<td>45 (25)</td>
<td>15 (37)</td>
<td>19 (35)</td>
</tr>
<tr>
<td>Tendonitis</td>
<td>5 (2)</td>
<td>5 (3)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Contusion/ haematoma</td>
<td>90 (30)</td>
<td>68 (38)</td>
<td>10 (24)</td>
<td>12 (22)</td>
</tr>
<tr>
<td>Abrasion/laceration</td>
<td>5 (2)</td>
<td>3 (2)</td>
<td>1 (2)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Concussion</td>
<td>2 (1)</td>
<td>2 (1)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other type</td>
<td>13 (4)</td>
<td>5 (3)</td>
<td>3 (7)</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Player interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td>134 (45)</td>
<td>88 (49)</td>
<td>14 (34)</td>
<td>27 (50)</td>
</tr>
<tr>
<td>Noncontact</td>
<td>162 (55)</td>
<td>92 (51)</td>
<td>27 (66)</td>
<td>27 (50)</td>
</tr>
<tr>
<td>Injury mechanism</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traumatic</td>
<td>248 (84)</td>
<td>151 (84)</td>
<td>32 (78)</td>
<td>50 (93)</td>
</tr>
<tr>
<td>Overuse</td>
<td>48 (16)</td>
<td>29 (16)</td>
<td>9 (22)</td>
<td>4 (7)</td>
</tr>
<tr>
<td>Injury condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Match</td>
<td>166 (56)</td>
<td>98 (54)</td>
<td>23 (56)</td>
<td>37 (69)</td>
</tr>
<tr>
<td>Training</td>
<td>130 (44)</td>
<td>82 (46)</td>
<td>18 (44)</td>
<td>17 (31)</td>
</tr>
<tr>
<td>New or recurrent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New</td>
<td>234 (79)</td>
<td>139 (77)</td>
<td>32 (78)</td>
<td>47 (87)</td>
</tr>
<tr>
<td>Recurrent</td>
<td>62 (21)</td>
<td>41 (23)</td>
<td>9 (22)</td>
<td>7 (13)</td>
</tr>
<tr>
<td>Total injuries</td>
<td>296</td>
<td>180</td>
<td>41</td>
<td>54</td>
</tr>
</tbody>
</table>

Data are presented as n (%). Values that are <1% are not shown.
incidence was 1.2 injuries per 1000 player hours for ankle sprain, 0.8 per 1000 player hours for thigh strain, and 0.8 injuries per 1000 player hours for groin/adductor strain. Amongst the thigh injuries, 82% of injuries were hamstring strains and 18% of injuries were quadriceps strains. Seventy-six percent (16/21) of all severe injuries were noncontact injuries (i.e., the players were absent from matches and training for >28 days).

The recorded overall time lost was 2261 days. Approximately 60% of all injuries were minimal injuries and 7% of all injuries were severe injuries. The most common severe injury type and moderate injury type were knee sprain and thigh strain, respectively. More than 50% of the players who sustained knee injuries missed >7 days of training or matches. Amongst the knee sprain injuries, approximately 15 (80%) injuries involved the medial cruciate ligament (MCL). The average time loss due to knee sprain injuries was 29.5 days per injury. Two-thirds of the moderate and severe thigh injuries (resulting in an absence of >7 days) were hamstring strain (10/15) and the average time loss was 9.4 days per injury.

Reinjuries

One-fifth of the overall injuries were recurrent injuries (Table 3); of these 29% (18/62) of injuries were classified as "early recurrence" (within 0–2 months); 39% (24/62) of injuries were classified as "late recurrence" (2–12 months); and 32% (20/62) of injuries were classified as "delayed recurrence" (>12 months). There was no significant difference between new injuries and recurrent injuries in the day of absences (p = 0.51). The most common recurrent injury was ankle sprain (25 of 62 injuries). Amongst the recurrent cases, one-third (6/18) of the early recurrent cases were ankle sprain and two-third (16/24) of the late recurrent case were ankle sprain.

Monthly variation of injury pattern

Fig. 1 illustrates the monthly distribution of injuries in match and training. The highest incidence of match injuries was observed in October (n = 115.9) with a 123% increment from September. The training injury incidence decreased gradually from September (n = 8.9) until December (n = 3.5), and remained stable afterwards. Fig. 2 shows that the incidence of contact injuries increased drastically by approximately 200% from September (n = 4.3) to October (n = 8.0). Fig. 3 shows that contusion, strain, and sprain injuries were the three most common types of injury. They follow a similar trend in which the risks of injury were higher in the early stages of the season (i.e., September and October).

Multiple analyses identified a significantly higher risk of injury in October (RR, 6.8; 95% CI, 6.7–6.9; p < 0.001). The second and third highest risks were in November (RR, 4.9; 95% CI 4.8–5.1; p < 0.001) and February (RR, 4.7; 95% CI 4.3–5.2; p < 0.001), respectively.
Discussion

The principal finding of this study was the high match injury incidence in this group of professional teams. Other important findings were that 52% of ankle sprains were recurrent, and 80% of moderate and severe strains were hamstring strains.

Exposure and injury risk

The injury risk for Hong Kong professional players during a match is 1.9–2.2 times higher than the injury risk for European professional football players. On average, each Hong Kong elite football player sustained approximately two injuries in the competitive season, which is similar to results of a European top league (1.3–2.5 injuries). For a team size of 25 players, 50 injuries per season would be expected.

The training injury incidence in this study is consistent with findings in British and other European top leagues, which ranges 3.5–4.1 injuries per 1000 player hours. However, the overall injury incidence (7.4 injuries per 1000 player hours) was slightly less than the incidence previously reported, which ranges 8–14.4 injuries per 1000 player hours. Our match injury incidence (61.1 injuries per 1000 player hours) was higher than other data reported in previous studies, which range 26.2–30.5 injuries per 1000 player hours. These studies adopted the same or similar time-lost injury definitions. The differences in injury risk between Hong Kong professional players and European professional football players may be explained by differences in the competition level and in the league system.

There are 10 fewer clubs in Hong Kong’s first league than in the English premier league, which provides a minimum 20-game difference in a season. Furthermore, because of geographical differences, European teams spend significant amounts of time travelling between home and away games. This may reduce their training exposures. Hong Kong professional players had a similar total exposure, higher training exposure, and lower match exposure in comparison to other European elite players. As a result, the overall injury incidence in Hong Kong was slightly less than in their European counterparts, whereas the game injury incidence was approximately two-fold that of the European players. In our study, the injury risk during games was >17 times greater than the injury risk during training. Previous studies have reported that the risk of injury may differ among European countries at the elite level. Game schedule, match intensity, tactics, weather, and pitch conditions could contribute to the discrepancy in the injury rate. It may also be that, at the league level, anthropometric data (e.g., weight and height) and the players’ skill level may contribute to the discrepancy in injury incidence. A previous study suggests that youth players with a higher skill level are at a higher risk of injury. These factors should be considered in future risk factor investigations in professional football.

Injury pattern

The common injury types in Hong Kong football players were ankle sprain (16%), thigh strain (11%), and adductor/groin strain (10%). These findings are consistent with findings in other studies of elite level football players. More than 80% of injuries occurred in the lower extremities. Approximately 90% of injuries were contusions, muscle strains, and ligamentous sprains, which is similar to the results (80% of injuries) in an epidemiological study of English professional football players. These findings are also similar to a recent investigation of football injuries among European top clubs, in which hamstring strains (12%), adductor strains (9%), and ankle sprains (7%) were the most common injury diagnosis.

In our study, thigh strain accounted for one-eighth of all injuries and 82% of the injuries affected the posterior thigh. More than 80% of hamstring strain injuries were noncontact injuries. The high incidence of hamstring strain in the world football stage may reflect the increased demands of high-intensity running and kicking motions, which involves rapid eccentric hamstring muscle contraction in movements. A prospective cohort study in Norwegian and Icelandic professional football players shows that a warm-up hamstring strengthening exercise could reduce the risk of hamstring strain injury.

From our results, the incidence of ankle sprain injury was high and showed an average time loss of 4.8 days per injury (1.2 injuries per 1000 player hours), which was inconsistent with the results of a recent study of European top clubs. This does not support the suggestion that the injury risk of ankle sprain has diminished in the recent decade. The high ankle sprain injury incidence may result from the competition level, game intensity, training on artificial turf, poor pitch condition, incomplete rehabilitation, etc. In our study, we observed that some teams in their daily practice did not apply taping after their training because of different reasons such as the lack of sports medicine education, lack of physiotherapists, or lack of athletic trainers. It is important to introduce to coaches and players evidence-based injury prevention strategies such as semirigid ankle orthosis, taping, and ankle disc training to prevent new and recurrent ankle sprain injuries.

Injury severity

In our study, the average number of days lost because of injury was 7.6 days. Severe injuries accounted for 7% of all injuries, which is consistent with the results from Danish leagues (12%) and Swedish leagues (9%). However, this result was less than that previously reported elsewhere (16–23%). The observed discrepancy could be the result of the playing level, frequency of games, and training.

Knee sprain and thigh strain were the most common severe injuries with 80% (15/19) of sprains at the MCL and two-thirds of moderate and severe thigh injuries diagnosed as hamstring strains. Physicians, sports scientists, and coaches should maintain their efforts in minimizing these severe injuries. To reduce the risk of severe injuries, coaches can
implement a weekly evidence-based injury prevention exercise program (e.g., FIFA 11+).19

Reinjuries

Twenty percent of all injuries in Hong Kong were recurrent injuries, which is within the range (12–30%) reported in the literature.2,5,22 The most common type was ankle sprain. For recurrent injuries, 52% of injuries were ankle sprains, 26% of injuries were hamstring strains, and 17% of injuries were groin/adductor strain injuries. It is a common practice in professional football for an injured player to return to play without finishing the full rehabilitation process or without seeking medical advice. Inadequate rehabilitation and previous injury history are known risk factors for different injuries.9,22

One-half of all recurrent cases, one-third of the early recurrent cases, and two-thirds of late recurrent cases were ankle sprain. Apart from inadequate rehabilitation, it may be that players may neglect working on the evidence-based injury prevention exercise program to reduce the risk of recurrent injury. Setting evidence-based return to play guidelines for different common football injuries may diminish reinjury in the long term.

Monthly variations of injury pattern

A two-fold increment in the overall injury risk occurred in the first 2 months of the season of the Hong Kong professional league. The injury risk peaked again in the second month (i.e., February) of the second half of the season. These results may be partially explained by the dramatic increment in October in the risk of match injury, traumatic injury, and contusion injury (Table 4). There was a 100% increase of contusion injuries from September to October, whereas strain and sprain injuries continually reduced. A study of a professional league showed that match injuries were high at the start of the competitive season in August.3 It may be that a physical fitness discrepancy may be present between teams because of varying lengths of preseason preparation. In the Hong Kong professional league, the short preseason period (i.e., approximately 4–6 weeks) may be inadequate for players to attain the appropriate physical and physiological level to withstand the stresses in an intensive game. A previous study suggests that teams with the longest preseason period have fewer injuries during the season.7 Hawkins et al.13 also discussed the disadvantages of a short preseason period for English professionals.

Methodological considerations

The strength of this study was that injury data and training exposure were collected in person on a weekly basis. This minimised recall bias that can occur in other injury surveillance methods such as retrospective player interviews.25 From a previous finding, prospective injury surveillance by the team medical staff may underestimate the incidence of time-loss injuries by at least one-fifth.25 In addition, we provided sport medicine-trained injury recorders for each club to improve the accuracy of the collected data. This study protocol followed the international consensus agreements on the procedure for data collection for epidemiological studies of football injuries which are recommended by FIFA and the Union of European Football Associations (UEFA).18,26 A comparison of the injury risk between different studies using the same operational definition would be feasible.

It would be valuable to extend this study in multicentre settings to investigate regional differences in the injury incidence and injury pattern in elite football. A web-based injury surveillance system may improve the effectiveness and the efficiency of collecting injury data in a multicentre basis.

Conclusion

A high match incidence existed in Hong Kong male professional football in which the injury risk was two-fold higher than that reported in European professional players. The risk of injury peaked in the beginning of the competitive season. The training incidence was consistent with findings in a previous study, whereas the overall incidence was slightly less than the incidence previously reported.

Ankle sprain was the most common injury type and 52% of sprains were recurrent. Thigh strain was the second most common injury type: 82% of thigh strains affected the hamstrings and 80% of hamstring strains were noncontact injuries. These findings could be generalised to Asian professional leagues in which players have daily training and weekly official matches.

A prospective multicentre epidemiological study is warranted to examine regional differences in injury risks. Coaches, players, health professionals, and researchers should join their efforts to investigate the effect on injury incidence and pattern in relation to the duration, and the content of the preseason period, and the number of friendly matches held during the preseason.

Conflicts of interest

All authors declare no conflicts of interest.
References


