



Fewer ligament injuries but no preventive effect on muscle injuries and severe injuries: an 11-year follow-up of the UEFA Champions League injury study

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► Additional data are published online only. To view this file please visit the journal online (<http://dx.doi.org/10.1136/bjsports-2013-092394>).

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Accepted 6 June 2013

ABSTRACT

Background Limited information is available on the variation in injury rates over multiple seasons of professional football.

Aim To analyse time-trends in injury characteristics of male professional football players over 11 consecutive seasons.

Methods A total of 1743 players comprising 27 teams from 10 countries were followed prospectively between 2001 and 2012. Team medical staff recorded individual player exposure and time loss injuries.

Results A total of 8029 time loss injuries were recorded. The match unavailability due to injury was 14% and constant over the study period. On average, a player sustained two injuries per season, resulting in approximately 50 injuries per team and season. The ligament injury rate decreased during the study period ($R^2=0.608$, $b=-0.040$, 95% CI -0.065 to -0.016 , $p=0.005$), whereas the rate of muscle injury ($R^2=0.228$, $b=-0.013$, 95% CI -0.032 to 0.005 , $p=0.138$) and severe injury ($R^2=0.141$, $b=0.015$, 95% CI -0.013 to 0.043 , $p=0.255$) did not change over the study period. In addition, no changes in injury rates over the 11-year period were found for either training ($R^2=0.000$, $b=0.000$, 95% CI -0.035 to 0.034 , $p=0.988$) or match play ($R^2=0.282$, $b=-0.015$, 95% CI -0.032 to 0.003 , $p=0.093$).

Conclusions The injury rate has decreased for ligament injuries over the last 11 years, but overall training, match injury rates and the rates of muscle injury and severe injury remain high.

INTRODUCTION

The injury rate (IR) in professional football is estimated to be approximately 1000 times higher than the overall rate for typical industrial occupations generally regarded to be high risk.¹ In 1999, the Union of European Football Associations (UEFA) initiated a research project aimed at reducing the number and severity of injuries and increasing player safety. This ongoing study, the so-called UEFA Champions League (UCL) injury study, has thus far involved 27 European top-level football teams from 10 different countries over 11 seasons. A previous report showed that a professional football team of 25 players can expect roughly 50 injuries, causing time loss from play each season.² This means that, on average, 12% of the squad was unavailable to train and play matches due to injury at any point during the season in that study.

Injuries negatively affect performance, and teams that can avoid injuries have greater success based on their final position in the league system.^{3–5} Therefore, preventing football injuries is important, and the fundamental first step is to conduct an injury surveillance study.⁶

The recent literature has been somewhat contradictory regarding potential changes in IRs among professional footballers during the 2000 s.^{2–7} In a previous 7-year follow-up of the UCL injury study, no apparent changes were found in the training and match IRs over time,² whereas another study of the Norwegian premier league reported an increased acute match IR during the six-season study period.⁷ Therefore, the objective of this study was to analyse time-trends (between-season variations) in the injury characteristics over the last 11 years in more detail. Our hypothesis was that general IRs have been stable over time.

MATERIAL AND METHODS

Study population

Twenty-seven male senior professional football teams with 1743 players from the top divisions in 10 European countries were followed prospectively over a varying number of seasons (1–11) between July 2001 and June 2012. Four 'core' teams (Arsenal FC, FC Internazionale Milano, PSV Eindhoven, and Real Madrid CF) participated in all the seasons included in the study. The teams were followed during full football seasons, including the pre-seasons. The full methodology and development of the study design were reported elsewhere.⁸

Study procedure

The study design followed the consensus on definitions and data collection procedures for studies of football injuries outlined by UEFA⁸ and in the consensus document for football injury surveillance studies.⁹ To ensure high reliability of data registration, all teams were provided with a study manual containing definitions and data recording procedures, including fictive examples. The manual and study forms were translated by experienced translators from English into five other languages: French, German, Italian, Russian and Spanish.

Player baseline data were collected once a year at the time of player inclusion. Individual player participation in training and matches (minutes of exposure) was registered by the club contact person on a standard exposure form. The collected information

To cite: Ekstrand J, Hägglund M, Kristenson K, et al. *Br J Sports Med* 2013;**47**:732–737.

included exposure on the first and second teams, as well as any national team exposure. The team medical staff recorded injuries on a standard injury form that provided information about the diagnosis and the nature and circumstances of the injury. All injuries resulting in a player being unable to fully participate in training or match play (ie, time loss injuries) were recorded. The player was considered injured until the team medical staff allowed full participation in training and availability for match selection (table 1). Injuries were categorised under four degrees of severity based on the number of days absent. All injuries were followed until the final day of rehabilitation. The Orchard Sports Injury Classification System was used to classify specific injuries.¹⁰ Injury and exposure forms were sent to the study group on a monthly basis. Reports were checked upon receipt by the study group and prompt feedback sent to the teams in order to correct any missing or unclear data. Supplementary online-only files 1 and 2 show the study design and the forms used and also the manual with practical instructions.

Inclusion and exclusion criteria

All contracted players in the first teams were invited to participate in the study on a voluntary basis. Players who left the team during the season (eg, due to transfer) were included for their time on the team. Fewer than five players declined participation during the study period.

Data analyses

Continuous data are presented as a mean with the corresponding SD. Lay-off times are presented as a median with corresponding IQR. IRs were calculated as the number of injuries/

1000 h with corresponding 95% CIs. The injury burden was calculated as the number of lay-off days/1000 h. IRs were compared using a rate ratio (RR) and significance tested using z-statistics.¹¹ Seasonal trends, expressed as the average annual percentages of change, were analysed using linear regression with the log-transformed IR as the dependent variable. In addition, a 2-year moving average (MA) approach summarising two consecutive seasons was used to visualise a smoother seasonal variation. Time-trend analyses were performed on training and match injuries as well as on the two most common injury categories (ligament and muscle injuries) and severe injuries. All analyses were carried out on two levels, including all teams or only the four 'core' teams. Analyses were two-sided and the significance level was set at $p < 0.05$.

RESULTS

Each team had an average of 25 players. The size of the contracted first team squad increased during the study period, from 23 ± 2 players during the 2001/2002 season to 26 ± 3 players during the 2011/2012 season ($p = 0.003$). Among the four 'core' teams participating in all the seasons, the squad size did not change (from 25 ± 2 to 27 ± 5 players, $p = 0.451$). In total, 1 057 201 h of exposure (888 249 h of training, 168 952 h of match play) were recorded.

Training attendance and match availability

As illustrated in table 2, the training attendance and match availability barely fluctuated between seasons, with a mean training attendance of 77% (range 75–79) and a mean match availability of 86% (range 84–88). The mean training attendance and match availability for the four 'core' teams were 74% (range 70–78) and 85% (range 83–87), respectively.

Injury epidemiology and time-trends

In total, 8029 injuries were documented, with 4546 (57%) occurring during matches and 3483 (43%) during training. Players sustained two injuries per season on average, which is equivalent to 50 injuries per season for a team of 25 players. The total IR based on all teams and all seasons was 7.6/1000 h (95% CI 7.4 to 7.8). The match IR was almost seven-times higher than the training IR (26.7 vs 4.0/1000 h, RR 6.7, 95% CI 6.4 to 7.0, $p < 0.001$). The training and match IRs per season across the 11-year study period are shown in figures 1 and 2. No seasonal changes were found in the IRs for training ($R^2 = 0.000$, $b = 0.000$, 95% CI -0.035 to 0.034 , $p = 0.988$) or match play ($R^2 = 0.282$, $b = -0.015$, 95% CI -0.032 to 0.003 , $p = 0.093$). Similar results were found in the MA IRs for training and match play, with annual decreases of 0.3% and 1.7%, respectively. Analysis of the four 'core' teams indicated a decrease in the match IR of approximately 3% ($R^2 = 0.550$, $b = -0.026$, 95% CI -0.044 to -0.008 , $p = 0.009$), but no trend was found for the training IR ($R^2 = 0.097$, $b = -0.007$, 95% CI -0.036 to 0.021 , $p = 0.572$). The MA approach with the 'core' teams resulted in similar findings, with an annual decrease in the match and training IRs of 2.3% and 0.9%, respectively.

The ligament IR decreased during the study period ($R^2 = 0.608$, $b = -0.040$, 95% CI -0.065 to -0.016 , $p = 0.005$), whereas the muscle IR was stable across seasons ($R^2 = 0.228$, $b = -0.013$, 95% CI -0.032 to 0.005 , $p = 0.138$). The MA approach found an annual decrease in the ligament and muscle IRs of 3.6% and 0.7%, respectively (figures 3 and 4). The four 'core' teams followed the same pattern as the total cohort, with a seasonal trend of a decreasing ligament IR ($R^2 = 0.727$, $b =$

Table 1 Operational definitions used in the study

Training session	Team training that involves physical activity under the supervision of the coaching staff
Match	Competitive or friendly match against another team
Injury	Injury resulting from playing football and leading to a player being unable to fully participate in future training or match play (ie, time loss injury)
Rehabilitation	A player is considered injured until the team's medical staff allows full participation in training and availability for match selection
Reinjury	Injury of the same type and at the same site as an index injury occurring no more than 2 months after a player's return to full participation from the index injury
Slight/minimal injury	Injury causing 0–3 days' absence from training and match play
Mild injury	Injury causing 4–7 days' absence from training and match play
Moderate injury	Injury causing 8–28 days' absence from training and match play
Severe injury	Injury causing more than 28 days' absence from training and match play
Traumatic injury	Injury with sudden onset and known cause
Overuse injury	Injury with insidious onset and no known trauma
Ligament injury	Traumatic distraction injury to a ligament leading to a player being unable to fully participate in training or match play
Muscle injury	Traumatic distraction or overuse injury to a muscle leading to a player being unable to fully participate in training or match play
Injury rate	Number of injuries per 1000 h ($(\Sigma \text{injuries} / \Sigma \text{exposure hours}) \times 1000$)
Injury burden	Number of days absent per 1000 h ($(\Sigma \text{days' absence} / \Sigma \text{exposure hours}) \times 1000$)

Table 2 Team exposure and injury characteristics from the 2001/2002 to 2011/2012 season

	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Total
Number of teams	11	9	11	9	17	17	14	14	18	20	20	160
Team squad size	23±2	23±3	23±3	23±3	23±2	24±3	25±3	26±3	25±3	26±3	26±3	25±3
Training sessions,* mean±SD	230±21	227±23	214±24	224±22	210±27	227±19	226±21	240±30	225±24	223±24	218±29	224±25
Matches,* mean±SD	59±10	63±6	62±4	62±4	61±6	61±6	62±5	61±6	62±4	62±5	61±5	61±6
Training attendance (%)	76	78	76	77	78	76	75	75	78	77	77	77
Match availability (%)	84	87	86	87	86	86	84	85	86	86	85	86
Training injuries,† mean±SD	30±14	20±9	22±14	19±7	19±10	26±12	27±10	23±10	21±11	22±13	20±9	23±11
Match injuries,† mean±SD	35±14	34±12	31±14	28±13	31±14	34±14	34±11	28±9	26±7	27±11	26±12	30±12
Total no. of injuries,† mean±SD	65±20	54±18	53±20	48±19	50±22	60±24	61±18	51±16	47±15	49±21	46±18	53±20
Days of absence due to injury,† mean±SD	977±288	840±387	788±329	791±274	860±342	927±335	958±293	953±293	843±365	897±336	836±274	881±317
Severe injuries,† mean±SD	10±4	8±5	8±4	6±3	9±5	9±3	10±4	8±4	9±3	8±4	9±4	9±4
Muscle injuries,† mean±SD	22±8	20±8	21±8	18±7	20±9	21±8	19±8	17±8	17±9	18±10	17±7	19±8
Ligament injuries,† mean±SD	14±6	10±4	9±5	11±7	10±5	11±11	9±4	8±4	7±4	8±3	7±3	9±6
Reinjuries (%)	16	10	11	12	10	11	12	12	10	14	11	12
Non-contact training injuries (%)				82	81	79	78	80	79	83	78	80
Non-contact match injuries (%)				58	56	53	54	52	58	59	62	57

*Each team's season data were adjusted to 11 months of activity.

†Each team's season data were adjusted to a squad size of 25 players and 11 months of activity.

−0.066, 95% CI −0.096 to −0.035, $p=0.001$) and no decline in the muscle IR ($R^2=0.147$, $b=-0.012$, 95% CI −0.033 to 0.010, $p=0.244$). In line with these trends, the ligament IR exhibited an annual decrease of 4.8% with the MA approach, and the muscle IR exhibited a slight increase of 0.3%.

Severe injuries accounted for 17% of all injuries; suggesting that an average team at this playing level can expect approximately eight severe injuries per season. The severe IR remained fairly constant over the study period (figure 5) and exhibited no significant trend ($R^2=0.141$, $b=0.015$, 95% CI −0.013 to 0.043, $p=0.255$). The annual increase in the severe IR was 0.8% based on the MA approach. Analysis of the four 'core' teams revealed a similar result for severe injuries in the regression model ($R^2=0.078$, $b=0.015$, 95% CI −0.023 to 0.053, $p=0.406$), but a somewhat higher annual increase of 2.2% with the MA approach.

Injury profile

Table 3 gives the 15 most common injury subtypes with regard to their frequency and lay-off time. This injury list covers more than 60% of all injuries that a team medical staff will encounter during a season.

DISCUSSION

The main finding in this study was that the IR among male professional football players decreased significantly for ligament injuries over the last 11 years, but that training and match IRs and muscle and severe IRs remain high, exhibiting no decrease over the study period.

Better treatment and prevention of ligament injuries

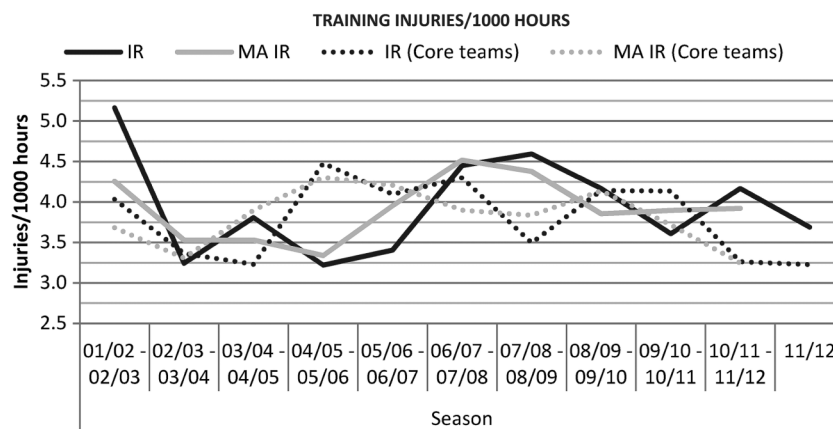
The ligament IR decreased by 31% during the study period. Sprains to the lateral ligament complex of the ankle and the medial collateral ligament of the knee are two of the most common football injuries, accounting for approximately 11% of all injuries. As shown in separate reports, the rates of these injuries decreased significantly over the past decade.^{12 13} A possible explanation of the decreased frequency of ligament injuries in general could be the implementation of intensive treatment and rehabilitation strategies by the teams,^{14 15} as well as established preventive methods, such as proprioceptive training and bracing/taping.^{13 16–18}

Effect of traditional preventive methods on other injuries

Our finding that muscle and severe IRs remain at the same level as 11 years ago is disappointing because injury prevention is essential for both the maintenance of player health and team performance. Theoretically, prevention of muscle injuries and severe injuries could have been increasingly effective over the study period, but the preventive effect was counteracted by an increased intensity of the game over the years. However, we were not able to find any studies indicating such changes during the 2000 s for these top-level teams.

Studies on a professional level have shown that injuries negatively correlate with a team's results and success.^{4 5} Fortunately, several studies have shown that prevention is possible, at least at the amateur and youth levels, through the implementation of multimodal interventions with male amateur and youth football players^{19 20} or specific neuromuscular warm-up programmes (predominantly for youth female players).^{21 22} However, the programme, 'The 11', had no effect on the overall IR or injury severity in male amateur players.²³ Thus far, no similar multimodal or neuromuscular preventive programmes have been tested in randomised controlled trials exclusively at the

Figure 1 Seasonal variation in training injury rates among male professional football players.



professional level, and carrying out randomised trials at this level might be difficult. However, the results from the present study indirectly suggest that prevention methods at the professional level have thus far only been effective for ligament injuries. Although all the aforementioned programmes are probably well known to members of the medical staff, it is the coaching staff who decide on training content, and coaches may not always be prepared to devote training time to preventive programmes. In addition, the applicability of these evaluated interventions to professional footballers can be questioned.

Do the available preventive programmes offer enough tissue stimulus for professional players?

Football is a high-intensity sport characterised by continuous changes in direction and high-load unipodal actions.²³ Speed is a key element in elite football as players have less time and space for their actions. Football training, including preventive methods, should be football-specific and mimic the actions in matches to be effective. However, many of the neuromuscular injury prevention programmes are basically static or have very controlled dynamic movements and might not offer a sufficient stimulus to achieve measurable preventive effects at the professional level where the velocity of player actions is high.²¹⁻²⁴ On the other hand, such programmes may be effective at preventing ankle and knee ligament injuries,^{21 22 24} but less effective at preventing muscle injuries, which could explain why the ligament IR, but not muscle IR, decreased in the present study.

Targeting player factors: Not enough for injury prevention?

Many preventive programmes focus on internal risk factors by providing the players with programmes aimed at increasing

person-related skills, such as strength, balance, coordination and flexibility.²¹⁻²⁸ However, studies of the internal risk factors for injuries in male elite football have reported only increasing age and previous injury as significant risk factors for new injury.³ Neuromuscular training programmes may have greater effects in youth players because they have not yet established their basic movement patterns.^{21 23} In contrast, professional footballers already have a high physical standard, and additional non-football-specific (without the ball) physical training may not be as effective due to a ceiling effect. The multifactorial nature of injuries within the game has led clinicians to segmentalise the problem and break down programmes into components, such as strength, flexibility, core stability and proprioception, sometimes with little resemblance to the football-specific player actions and movements.

External factors, such as player load and match frequency, might be important mechanisms underlying injuries.²⁹ The training load on players is traditionally decided by the coaching staff, whereas the long-term load, such as planning the season, number of matches and promotional activities, is normally decided by the board in cooperation with the coaching staff, but usually without influence from the medical staff. The overall training load is the sum of the football training and fitness training. These two programmes are often run by different members of the coaching and fitness staff, and good internal communication is important in order to monitor and adapt the load on individual players.

Other factors, such as consistency and the stability of the club in terms of coaching, medical staff and management, as well as the playing style of the team, could also be important external factors to consider in injury prevention. Therefore, decisionmakers

Figure 2 Seasonal variation in match injury rates among male professional football players.

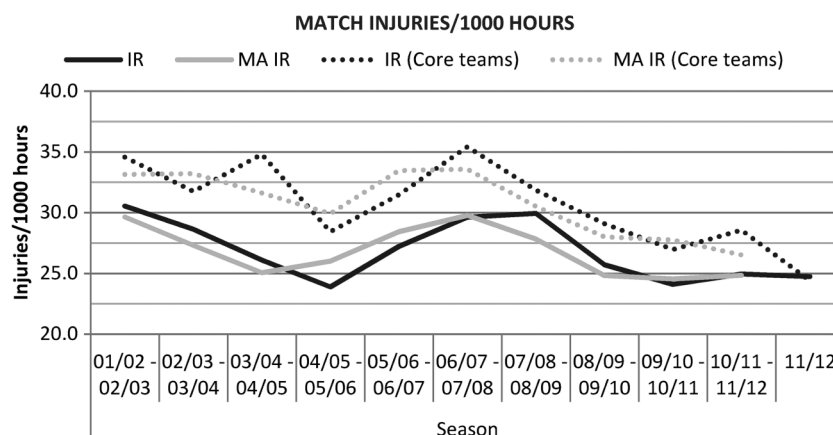


Figure 3 Seasonal variation in ligament injury rates among male professional football players.

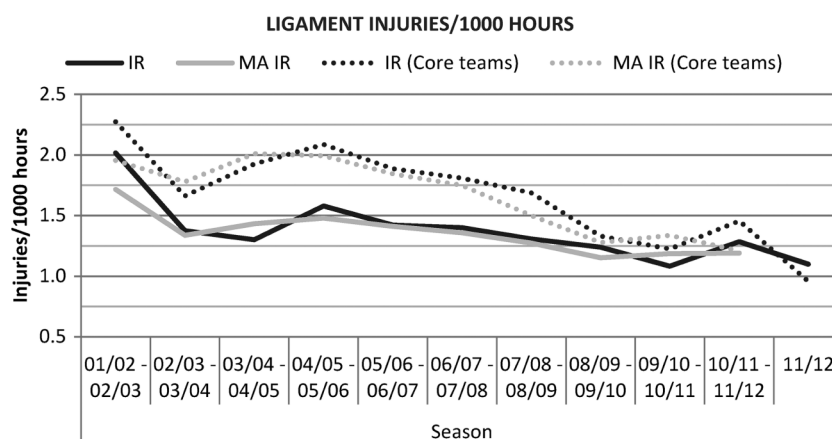
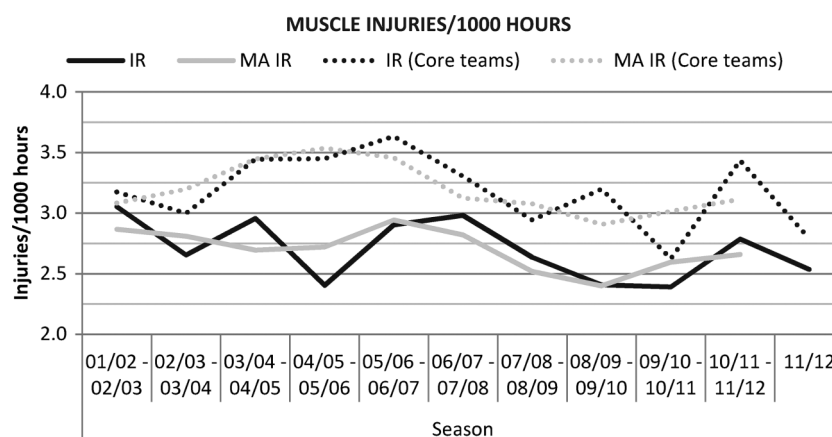


Figure 4 Seasonal variation in muscle injury rates among male professional football players.



(eg, coaches and managers) could play important roles in injury prevention and be decisive for the overall injury situation in a club, but such external factors have not yet been evaluated in injury studies. A lack of continuity in management, coaching and medical teams could be hypothesised to be factors related to injuries, but player transiency might also be influential. In the modern football community, players frequently move to new clubs and are therefore exposed to different training environments, training and match loads and climate conditions.

Methodological considerations

The strength of this study is the substantial dataset obtained from a homogeneous group of male professional footballers.

Data recording followed international consensus agreements on procedures for epidemiological studies on football injuries.^{8,9} Importantly, no golden standard exists for the statistical methods used to evaluate time-trends in injury characteristics over multiple seasons. The present study primarily used a linear regression with log-transformed IRs as the dependent variable, but as a 'sensitivity analysis', a 2-year MA approach was also used. In general, the two methods presented similar findings, showing that the dataset and the observed time-trends are robust.

A limitation of the study is that the participating teams varied during the study period. However, four teams participated in all seasons and exploratory analyses of these four 'core' teams did

Figure 5 Seasonal variation in severe injury rates among male professional football players.

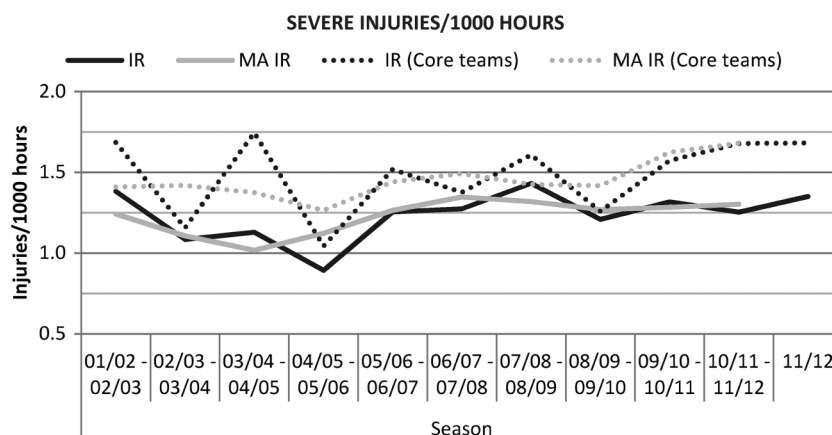


Table 3 Fifteen most common injuries and their burden

Diagnosis	Injuries (% of all injuries)	Injury rate*	Mean lay-off days \pm SD	Median lay-off days (IQR)	Injury burden†
Hamstring muscle injury	1025 (12.8)	1.0	19 \pm 18	14 (15)	18.2
Adductor injury	742 (9.2)	0.7	15 \pm 19	9 (12)	10.3
Ankle sprain, lateral	552 (6.9)	0.5	15 \pm 19	8 (14)	7.7
Quadriceps muscle injury	404 (5.0)	0.4	21 \pm 22	14 (17.5)	8.1
Calf muscle injury	362 (4.5)	0.3	19 \pm 16	15 (17)	6.5
Knee sprain, medial	346 (4.3)	0.3	23 \pm 23	16 (23)	7.6
Hamstring hypertonia	224 (2.8)	0.2	7 \pm 7	5 (6)	1.5
Knee contusion	213 (2.7)	0.2	5 \pm 6	4 (4)	1.1
Thigh contusion	211 (2.6)	0.2	7 \pm 9	4 (4)	1.4
Achilles tendinopathy	194 (2.4)	0.2	23 \pm 37	10 (20)	4.2
Foot contusion	191 (2.4)	0.2	6 \pm 6	4 (4)	1.0
Ankle contusion	182 (2.3)	0.2	6 \pm 10	4 (5)	1.1
Low back pain	163 (2.0)	0.2	10 \pm 19	5 (5)	1.5
Knee synovitis	148 (1.8)	0.1	14 \pm 29	6 (10.5)	2.0
Calf contusion	126 (1.6)	0.1	7 \pm 14	4 (5)	0.9

*Injury rate expressed as number of injuries/1000 h.

†Injury burden expressed as number of injury days absent/1000 h.

not differ from the overall results, except for a decrease in match injuries, strengthening the overall findings of the study. Another limitation was that information was not collected about diagnostic and treatment methods for all injuries. However, for some of the more common or attention-drawing injuries, such as ACL ruptures, metatarsal fractures, thigh muscle injuries and groin injuries, substudies including information about treatment and diagnostic procedures have already been carried out.^{13 30–35}

What are the new findings?

- The ligament injury rate (IR) in European male professional football decreased during the 2000s.
- Total IRs for training and matches, as well as for muscle and severe injuries, remain high without a decrease.

How might the study impact clinical practice?

- Preventive actions targeting player-related risk factors might not be enough at the professional level, except possibly for ligament injuries.
- External risk factors, such as training load, playing style and continuity of club medical and technical staff, should be considered in injury prevention and be investigated further.

Acknowledgements The authors wish to thank the participating clubs, medical staff and players. We also acknowledge the valuable contributions from Paul Balsom, Performance Manager National A Team Sweden; Dave Rennie, Head Physiotherapist of Leicester City FC and Raymond Verheijen, World Football Academy.

Contributors JE, MH and MW were responsible for the conception and design of the study. All authors were involved in data collection over the study period. JE and HM conducted the analyses, which were planned and checked with the coauthors. All authors contributed to interpretation of the findings and had full access to all data. JE wrote the first draft of the paper, which was critically revised by MH, KK,

HM and MW. The final manuscript was approved by all authors. JE is the study guarantor.

Funding This study was supported by grants from UEFA, the Swedish National Centre for Research in Sports and Praktikertjänst AB.

Competing interests None.

Patient consent Obtained.

Ethics approval The study design was approved by the UEFA Medical Committee and the UEFA Football Development Division.

Provenance and peer review Not commissioned; externally reviewed.

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UEFA Champions League Injury Study

Study Manual 2013-2014

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1 Study definitions

To be able to draw meaningful conclusions from the results of the UEFA Injury Study study it is vital that all participating clubs are instructed to collect data in a uniform fashion. Study definitions are essential in clarifying what is meant by a football injury? This study manual contains definitions of important terms used in the study and illustrations with examples of how to fill in the data collection forms.

1.1 Training exposure

Training exposure is defined as any team-based or individual physical activities under the control or guidance of the team's coaching or fitness staff that are aimed at maintaining or improving players' football skills or physical condition.

- A recovery session with water training after a match is considered as a training session
- Training exposure includes training sessions for first team players who also sometimes play for teams other than the first team, for example the club's reserve team, or national teams
- Theory sessions ("chalk talk"), teaching sessions, etc. are not considered a training session
- Any exercise performed as a part of a player's rehabilitation programme due to injury is not considered as training exposure

1.2 Match exposure

Match exposure is defined as play between teams from different clubs.

- Match exposure includes matches for first team players who also sometimes play for teams other than the first team, for example the club's reserve team, or national teams

1.3 Injury

In this study we use a time-loss definition of football injury:

An injury is any physical damage that occurs during a football training or match and results in the player being unable to participate fully in training or match play.

- Injuries that do not cause absence from football activities do not count
- Injuries that occur outside football activities do not count
- Multiple injuries sustained by a player in a single event should be recorded as one injury, but all separate diagnoses should be recorded on the Injury Card
- Illnesses and diseases are separated from injuries (see section 6)

A traumatic injury refers to an injury resulting from a specific, identifiable event, and an overuse injury to one caused by repeated micro-trauma without a single, identifiable event responsible for the injury.

1.4 Rehabilitation

A player is recorded as injured for as long as he cannot participate in all types of training or in matches. A player is considered fully rehabilitated when the team physician or physiotherapist declares him fit for full participation.

If any part of a training session is modified for a player due to an existing injury this is considered part of the rehabilitation programme for that player.

1.5 Re-injury

Re-injury is defined as an injury of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the previous injury.

- The index injury can refer to a previous injury sustained prior to the start of the study
- Injuries such as contusions, lacerations and concussions, as well as sequels from an index injury should not be recorded as a re-injury
- The date of return from the index injury should be recorded on the injury card so that the time elapsed between the index injury and the recurrent injury can be evaluated

1.6 Illness

Similar to the definition of injury, we use a time-loss definition of illness:

A recordable illness episode is any physical or psychological complaint (separated from injury) which results in the player being unable to participate fully in training or match play.

1.7 Recurrence of illness

Recurrence of illness is defined as an illness episode of the same type as an illness episode the player has suffered previously, which occurs after a player's return to full participation from the previous illness-episode.

2 Contact information, study period and inclusion/exclusion criteria

2.1 Who should be the club's contact person?

Each club should select a contact person for this study (even though more than one person from the club may be involved in the data collection). The contact person will be responsible for delivering the study forms to the study group. We suggest the team physician or physiotherapist as contact person.

2.2 Study period

Study registration (exposure and injuries) starts July 1st 2013 and includes the entire pre-season and competitive season. The registration ends with the last match of the season in May 2014.

2.3 Inclusion/exclusion criteria

All players in the first team squad (with a first team contract) should be included in the study.

- A player who joins the team during the season should be included from his date of joining the team
- A player who has an existing injury at the start of the study should be included, but this particular injury will not be included in the injury statistics
- A player who permanently leaves the club during the study period is excluded from the date when they leave the club, but if the player goes on loan to another club he is included again when returning to the club
- If a player has an injury when he leaves the club, the contact person should still send in an injury card for that injury and estimate the final recovery date from injury

3 How to fill in the Declaration of Consent form

All players should be informed about the study's aims and should sign the Declaration of Consent form, thereby confirming that they are willing to participate. Participation is voluntary; the player can withdraw from the study at any time. **Example 1 on page 17 shows you how to fill in this form.**

- Start by filling in the name of the team, responsible team physician and team physiotherapist
- Name: register all first team players as defined above
- Code number: give each player a code number by combining two or three letters from the club name with the figure corresponding to the line in the list. It is important that the player keeps the same code number throughout the study
- Birth date, height, weight: player's birth date (e.g. 87/06/09); height in centimetres; weight in kilograms
- Dominant leg: preferred kicking leg (R = right-footed, L = left-footed, R+L = no preferred leg)
- Playing position: GK (goalkeeper), DF (defender), MF (midfielder), FW (forward)

4 How to fill in the Attendance Record form

All training sessions and matches for the listed players should feature on the Attendance Record. The Attendance Record is included as an Excel 2010 file. Clubs should e-mail this form to the study group every month. Start by filling in the information on the players flap, the information will appear automatically on the training and match log. Information about player participation in team training, match play and national team duty should be entered separately on each flap in the Excel spreadsheet.

Use this paragraph (paragraph 4) as a checklist when you fill out the attendance record, you can print these pages (6-8) and keep them close at hand as a fast reference to make it easier. You may also print out a paper copy of the Attendance Record (press print when the training flap or match flap is opened) and fill it in by hand during training sessions and matches and then transfer it to the excel file at the end of the month.

4.1 Players (black flap)

1. Enter information about club and contact person
2. Enter player names and codes

NOTE: Fill in this information first and save a copy of the file; this way you will not have to enter this information each month.

3. Enter month/season and save a copy of the file named for this month

The example 2 on page 18 shows the Players flap.

4.2 Training (blue flap)

Use one column for each training session. If the team has two training sessions on the same day, use two separate columns. For each training session, enter the following information:

1. Enter type of training

Possible options:

- **F** – Football training
- **O** – Other type of training (e.g. strength, endurance, recovery)
- **R** – Reserve/youth team training

NOTE: Use the abbreviation **FO** for a combination of football training and other type of training if this occurs during the same training session (e.g. first 45 min of the training is football training and the last 45 min is strength/endurance training).

NOTE: If the players have different types of training on the same day, use separate columns for each group (e.g. the day after a game, the players that participated in the match may have a recovery session, while the players that did not play in the match have a football session: use one column for the players that have a recovery session and a separate column for those who have a football session)

2. Enter playing surface

Possible options:

- **A** – Artificial turf
- **G** – Grass
- **O** – Other surface

3. Enter date (day) of training session

4. Enter length of the training session (in minutes) from start of warm-up to end of session

By default, all players will be considered to have completed the full training session unless indicated otherwise. If a player only participates in a part of the training session or is absent from the training session, enter the following information in the cell for this player:

- a. Enter the **number of minutes** that a player participated, if not the full session
- b. Enter **AT** in the cell if player is absent from training due to injury
- c. Enter **IT** in the cell if player is absent from training due to illness
- d. Enter **O** in the cell if player is absent from a training session he should attend but for reasons other than injury or illness cannot (e.g. vacation, non-football related injury)
- e. **Clear the cell** (empty) if player has a day off (e.g. the day after a match)
- f. Enter **N** in the cell if player is absent from training because of national team duty

The example 3 on page 19 shows the Training flap.

4.3 Match (green flap)

Use one column for each match. If some players participate in a reserve/youth team match on the same day that the first team has a match, use two separate columns. For each match, enter the following information:

1. Enter type of match
2. Enter playing surface (as in the training flap)

Possible options:

- | | |
|-------------------------------------|----------------------------------|
| ➤ F – Friendly | ➤ EL – UEFA Europa League |
| ➤ L – League | ➤ C – Other cup |
| ➤ CL – UEFA Champions League | ➤ R – Reserve/youth team |

3. Enter date of match (day)

4. Enter match exposure for each participating player (minutes)

If a player is absent from the match, enter the following information in the cell for this player:

- Enter **AM** in cell if player is absent/unavailable from match owing to injury
- Enter **IM** in cell if player is absent/unavailable from match owing to illness
- Enter **O** in cell if player is absent/unavailable from match for other reasons
- Leave the **cell empty** if player is a substitute and does not play or is not selected for match
- Enter **N** in cell if player is absent/unavailable from match because of national team duty

NOTE: The total time played in a match should normally be 990 (11 x 90) minutes. This can vary if either a reserve team player participates, a red card is given to a player, or if over time is played. The total time played in a match with over time is normally 1320 minutes.

The example 4 on page 20 shows the Match flap.

4.4 National team (red flap)

All football activities of the listed players should feature on the Attendance Record form, which includes training sessions and matches with their national teams.

- Enter date of match (day)
- Enter playing surface (as in the training flap)
- Enter match/training exposure for each player (minutes)

NOTE: Training sessions with the national team are registered in the columns on the left, and national team matches are registered in the columns on the right.

The example 5 on page 21 shows the National team flap.

4.5 Sending Attendance Records to the study group

- Save a copy of the file each month and e-mail the file to the study group. Name the file according to the following example: "Example team July 2011"
- Send to: Håkan Bengtsson e-mail address: info.frg@telia.com
- Open a new file (from the template) for the next month. Do not add new flaps to the document

4.6 Monthly feedback

Upon receiving the reports from teams, the study group will check everything for completeness. When data for the month is complete we will send you two feedback reports:

- Player feedback: with individual statistics on training sessions (number, hours), matches (number, hours), injuries (training, match) and absence due to injury, national team duty and other reasons. Team statistics are shown at the bottom of the form for the number of training sessions and matches, squad availability (which shows the percentage of players that were participating in training or available for first team match selection; e.g. 100% means

that no player missed a team training or match due to injury absence, other absence or absence due to national team duty) and absence due to injury or illness (which shows the percentage of players that were absent from training and match play due to injury or illness, respectively).

- Exposure overview: overview of the exposures and absences during the month as recorded on the Attendance Record.

4.7 What if players join or leave the team during the season?

If new players join the team during the season they should still be included in the study. Enter the names of the player and a new code on the players flap (black) and they will appear automatically on the training and match records (do not use old player codes).

If a player leaves the team, remove the name from the players flap, but leave the row empty. Do not enter new players in the same row as a previous player.

5 How to fill in the Injury Card form

An Injury Card should be filled in for every injury that occurs during the study (see definitions). The Injury Card is a simple form that should only take one minute to fill in. The **example 6 on page 22 illustrates how to fill in this form.**

- Start by filling in the name, code and team of the injured player (use the same code as on the Attendance Record and Declaration of Consent forms)
- Date of injury: fill in the date the injury occurred (irrespective of when the injury was assessed by the medical team). If for some reason the date of injury is uncertain fill in the last date on which the player participated fully in a match or a training.
- Date of return: fill in the date of the player's return to full participation

NOTE: send in the Injury Card even if the player is still in rehabilitation, e.g. due to a severe injury. Information about return to play can be added later on by the study group based on the Attendance Record

- Injured body part: mark the appropriate body part
- Injury side: mark the injury side
- Type of injury: mark the type of injury, or specify if another injury type
- Diagnosis: write a free text diagnosis and be as specific as possible (the study group will then recode according to the Orchard Sports Injury Classification System)

NOTE: write in Latin or English preferably e.g. rupt. musc. rectus femoris dx, commotio cerebri, left quadriceps contusion, etc. Sometimes the diagnosis might be preliminary and it is acceptable to report a preliminary diagnosis, for example "distorsion of the left knee". If a diagnosis is changed later on, e.g. after an MRI or an arthroscopy, you can send a copy of the original report, indicating "change of previous diagnosis" and change to a more precise diagnosis, for example "Ruptura ACL+MCL+meniscus medialis, genu dx".

- Re-injury: mark whether the injury is a re-injury or not (see definitions). For re-injuries, the return date from the previous (index) injury should be recorded

NOTE: if the player had the index injury prior to their involvement in the study, the injury should still be marked as a re-injury

- Overuse/trauma: mark whether the injury was caused by overuse or trauma, or if this classification is not applicable (e.g. elective surgery)
- Training/match: mark whether the injury occurred during a training session or match. For match injuries, mark the minute of the match when the injury occurred. Mark 'not applicable' if classification into training or match injury is not possible (e.g. overuse injury)
- Type of training/match: mark the appropriate alternative. Note that Champions League and Europa League matches include qualification matches for these tournaments
- Contact/collision: mark if the injury occurred as a result of contact with another player or object

- Injury mechanism: mark the mechanism of injury. You can also write additional information about the injury mechanism in the free text box
- Referee's sanction: This row should only be completed for acute match injuries. "No foul" should be filled in if the referee did not signal for a foul (whatever the opinion on the bench was!) and one of the "yes" options if the referee signalled foul play. "Opponent foul" is marked if the foul play was caused by an opponent and "own foul" if the foul play was caused by the injured player himself. For foul play injuries, indicate whether the player was sanctioned with a yellow or red card.
- Examination: Specify what kind of examination(s) was/were performed.
- Best guess as to why injury occurred: we appreciate the medical teams reasoning and ideas and we encourage you to share your view on the injuries and why you think that the player incurred the injury.
- Other comments: write any information that you think is appropriate to provide a better understanding of the injury. For instance, mark if it is a change to a previous diagnosis

5.1 Thigh Injury Card

If a player sustains a thigh injury, the specific Thigh Injury Card should be filled in (you don't have to fill in the general Injury Card). The information on the Thigh Injury Card is identical to the general Injury Card, but with some additional information required (injury classification, examination, treatment). ***The example 7 on page 23 illustrates how to fill in this form.***

Injury classification is made according to the following definitions of muscle disorders:

Functional muscle disorders: painful muscle disorder without evidence of muscle fibre damage.

- Fatigue-induced muscle disorder: circumscribed longitudinal increase of muscle tone due to over-exertion, change of playing surface, or change in training patterns. Pain with activity but not at rest. Increased muscle tone is noted in the affected muscle area with mild, dull pain aggravated by palpation or stretching. "Dry muscle" changes without oedema formation are typical on imaging modalities.
- Delayed Onset Muscle Soreness (DOMS): more generalized muscle pain following unaccustomed, eccentric deceleration movements with possible associated sarcomeric ruptures of Z-discs. Presents as dull, aching pain in the affected muscle groups usually peaking within 24-72 hours after initiating activity. Pain is aggravated by stretching, palpation, or eccentric exercise. Pain is absent at rest and less severe or absent with concentric muscle activity. No or minimal signal changes are observed in the involved muscle on imaging.
- Neuromuscular muscle disorder – spine related: circumscribed longitudinal increase of muscle tone due to functional or structural spinal disorder (including sacroiliac joint). Subjective tightness and pain with intense activity, stretching and palpation. Sometimes associated with altered skin sensation. Increased muscle tone over the entire muscle length on palpation. Symptoms improve with rest. Discrete "seam-like" fluid accumulation between muscle and fascia throughout the entire length of the involved muscle on imaging.

- Neuromuscular muscle disorder – muscle related: circumscribed spindle-shaped area of increased muscle firmness. Possibly resulting from reciprocal inhibition of synaptic transmission. Increasing pulling and cramp-like sensation within muscle. Aggravated with activity and improved by rest and gentle stretch. Spindle-like, longitudinal induration within the affected muscle belly on palpation. Spindle-like muscle oedema without hematoma or focal muscle defect on imaging.

Structural muscle disorders: any acute indirect muscle disorder with macroscopic evidence of muscle fibre damage.

- Partial muscle injury – minor: structural muscle injury involving only Intra-Fascicle Tear. Acute, sharp pain often at muscle-tendon junction. Focal pain on palpation without palpable defect. No visible hematoma. Aggravation of pain by stretching and palpation. Intra-fascicle hematoma and focal muscle defect on imaging with intact surrounding fascia.
- Partial muscle injury – moderate: structural muscle injury involving Inter-Fascicle or Muscle Bundle Tear. Acute severe, stabbing pain often at muscle-tendon junction, often associated with fall from reflectory unloading. Palpable, defined defect in affected muscle, painful to touch and gentle stretch. Quickly developing, visible hematoma. Defect of muscle, fascia, and hematoma visible on imaging.
- Subtotal/complete muscle injury/tendinous avulsion: structural muscle injury involving the subtotal (>90%) or complete muscle diameter or complete tendinous avulsion. Acute severe pain (“someone kicked/hit me”) and reflectory unloading. Severe pain with passive motion and palpation. Immediate functional deficit with development of extensive hematoma. Large palpable defect often at the muscle-tendon junction or retraction of avulsed muscle. Obvious muscle defect or tendinous avulsion and with hematoma formation is observed on imaging.

6 How to fill in the Illness Card form

An Illness Card should be filled in for every illness that occurs during the study (see definitions). The Illness Card is a “one-minute form”, meaning that it should only take one minute to fill it in.

The Example 8 on page 24 illustrates how to fill in this form.

- Start by filling in the name, code and team of the injured player (same code as on the Attendance Record and Declaration of Consent forms)
- Date of illness debut: fill in the date when absence due to illness first appeared (irrespective of when the injury was assessed by the medical team)
- Date of return: fill in the date of the player’s return to full participation

NOTE: send in the illness card even if player is still ill, Information about return to play can be added later on by the study group based on the Attendance Record

- Type of illness: fill in the type of illness corresponding to the player’s complaints. If you chose “other illness”, please indicate affected organ system
- Recurrence: mark whether the illness is a recurrence or not (see definitions). For recurrences, the return date from the previous illness episode should be recorded
- Diagnosis: fill in the most exact diagnosis of the illness
- Other comments: fill in other type of information relevant for the study group

7 Practical examples of recordings

Description: *Injury with time loss from football with a subsequent recurrence.*

Example: A defender sustained a hamstring injury during a match that required 30 days of rehabilitation before he could return to full training. The player sustained another hamstring injury to the same muscle (same leg) 3 weeks later in training and required a further 50 days of rehabilitation before he could return to full training.

Entry: First incident should be recorded as a match injury (absence 30 days); second incident as a training injury; re-injury (absence 50 days) should include the end date of the index injury.

Description: *Injury without time loss from football.*

Example: A goalkeeper develops shoulder instability and seeks medical attention; the condition does not prevent the player from taking part fully in team training or competition, even though it causes some pain. The team physiotherapist recommends an additional individual training programme for the goalkeeper to avoid aggravating the condition.

Entry: Episode should not be recorded as an injury as long as the goalkeeper remains able to take part fully in team training. Mark with full participation in training on the Attendance Record. No injury card is required in this case.

Description: *Injury without initial time loss that causes absence later on.*

Example: A defender develops groin pain which the team physician decides does not warrant immediate treatment; the player continues to take part fully in team training and competition. The player then undergoes elective surgery two months later and requires 90 days' rehabilitation.

Entry: Incident should be recorded as an injury at the time of the player's elective surgery (absence 90 days). An injury card should be sent.

Description: *Injury without initial time loss that causes absence later on due to an aggravation of symptoms.*

Example: A forward sustains an ankle sprain during a match but continues to play; he also completes full training using ankle taping (with some pain) for 6 days but aggravates the injury during the next match; he then requires 15 days of rehabilitation.

Entry: First incident should not be recorded as an injury; second incident should be recorded as a match injury (absence 15) days.

Description: *Player has an injury that only causes absence on the day of injury.*

Example: A midfielder sustains a laceration to the face during a morning training session; the doctor sutures the cut but the player misses the afternoon training session. The player is able to participate fully in the training session the next morning.

Entry: Incident should be recorded as an injury (absence 0 days).

Description: *An injured player plays in a reserve team match as a part of the rehabilitation programme.*

Example: A player has been operated on for an ACL injury. The team physician does not yet consider him fully rehabilitated but allows him to play with the reserve team as a part of the rehabilitation programme.

Entry: Mark as injured on the Attendance Record; match is considered part of the rehabilitation process and no match exposure is recorded.

Description: *A player is declared fully rehabilitated and plays in a reserve team match.*

Example: The team physician has declared a player fully rehabilitated after an ankle sprain. The coach does not select him for the first team but the player plays for 75 minutes with the reserve team.

Entry: Since the player has been declared fully rehabilitated this counts as match exposure with the reserve team. Mark 75 min participation with reserve team on the Attendance Record.

8 Sending the forms to the study group

8.1 How to send the forms?

- The “Declaration of consent” form should be completed electronically and e-mailed to the study group – then printed out and completed with player signatures and sent by fax or post
- The Attendance Record should be completed electronically and sent by e-mail
- The Injury Card and Illness Card can be completed electronically and sent by e-mail, but can also be sent by fax if this is preferred

8.2 When to send the forms?

There are usually some questions about details during the first month of registration. Intensive communication by fax, email or telephone is often necessary during the first month before all parties become familiar with the routines. Identical collection of data for all teams is necessary for a meaningful analysis.

- Send the Declaration of Consent form at the start of the study. The list of first team players might be incomplete at that time, but it is possible to complete this list later
- At the end of each month, e-mail the Attendance Record, Injury Cards and Illness Cards. Then a discussion can take place about filling in the form. The sooner the data on the forms are standardised, the less work is required of the contact person at the club and the study group
- Be sure to check the correlation between the Injury/Illness cards and the Attendance Record. For every new injury/illness episode there should be an injury card (except for events that occurred before the start of the study)

Be sure to check that the players and the code numbers correspond with those indicated on the forms!

8.3 Confidentiality

All data on individual players and teams will be confidential. The information sent will always be restricted to the study group. All data on players will be encoded before being computerised.

It is possible (but not necessary) for the contact person at each club to do the encoding themselves and delete the names of the players on the different forms. In this case, it is absolutely essential to fill in the code numbers and to check that these are correct.

Questions?

Do not hesitate to contact the study group (see first page).

I hereby confirm that I agree to participate in the UCL Injury Study and that the information provided is for medical and research purposes and will be treated confidentially.

Team: Example team

Responsible physician: Dr No

Responsible physiotherapist: _____

Name of player	Code no	Birth date (yy/mm/dd)	Height (cm)	Weight (kg)	Domin. Leg*	Playing position†	Signature of player / Date
Fred White	ET01	72/03/25	195	88	R	GK	Fred White 10/07/2011
Stanley Black	ET02	76/12/12	185	82	R	DF	Stanley Black 10/07/2011
John Purple	ET03	80/05/05	187	83	R	DF	John Purple 10/07/2011
Steve Yellow	ET04	82/07/09	172	73	L	DF	Steve Yellow 10/07/2011
Vince Pink	ET05	86/02/27	190	84	R+L	MF	Vince Pink 10/07/2011
Brad Turquoise	ET06	83/10/11	184	80	R	MF	Brad Turquoise 10/07/2011
Mike Grey	ET07	76/05/14	188	79	R	DF	Mike Grey 10/07/2011
Gary Marine	ET08	80/09/18	173	77	L	DF	Gary Marine 10/07/2011
James Brown	ET09	82/03/27	179	79	L	MF	James Brown 10/07/2011
Christopher Blue	ET10	77/04/30	181	74	R	MF	Christopher Blue 10/07/2011
Daniel Orange	ET11	80/06/25	191	86	R	FW	Daniel Orange 10/07/2011
Joseph Lime	ET12	82/11/11	183	80	R+L	FW	Joseph Lime 10/07/2011
Robert Red	ET13	83/10/19	169	73	R	FW	Robert Red 10/07/2011
Richard Indigo	ET14	79/09/03	174	78	R	MF	Richard Indigo 10/07/2011
William Lavender	ET15	78/07/06	180	79	L	FW	William Lavender 10/07/2011

* Dominant leg = preferred kicking leg: R (right), L (left) or R+L (no preferred leg) † Playing position: GK (goalkeeper), DF (defender), MF (midfielder), FW (forward)

Example 2. Attendance Record – Players (black flap)

PLAYER NAME	CODE
Fred White	ET01
Stanley Black	ET02
John Purple	ET03
Steve Yellow	ET04
Vince Pink	ET05
Brad Turquoise	ET06
Mike Gray	ET07
Gary Marine	ET08
James Brown	ET09
Christopher Blue	ET10
Daniel Orange	ET11
Joseph Lime	ET12
Robert Red	ET13
Richard Indigo	ET14
William Lavender	ET15

Club:	Example Team
Month/season:	July 2011
Contact person:	Dr No
E-mail:	DrNo@exampleteam.uk
Phone:	+44100304050
Mobile:	+44700304050
Fax:	+44100304051

Example 3. Attendance Record – Training (blue flap)

Example Team

July 2013

Type of training			F	F	FO	F	O	F	FO	FO	O	F	F	F	F	O	FO	F	FO	R	F	FO
Type of surface			G	G	G	G	O	G	G	G	O	G	G	G	G	G	G	G	G	G	G	G
Player name	Code	Date	1	2	3	6	7	10	11	13	14	15	15	16	19	19	20	22	23	25	26	27
		Exp	90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120	100	90	120
Fred White	ET01		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
Stanley Black	ET02		90	90	AT	AT	AT	AT	100	75	60	90	60	90	60	60	90	90	120		90	120
John Purple	ET03		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
Steve Yellow	ET04		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	IT	IT		90	120
Vince Pink	ET05		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120	100	90	120
Brad Turquoise	ET06		90	90	90	90	75	75	100	N	N	N	N	90	60	60	90	90	120		90	120
Mike Gray	ET07		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
Gary Marine	ET08		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
James Brown	ET09		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
Christopher Blue	ET10		90	90	90	90	75	75	100	75	60	90	60	90	30	AT	AT	AT	AT		AT	AT
Daniel Orange	ET11		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
Joseph Lime	ET12		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120	100	90	120
Robert Red	ET13		90	90	90	90	75	75	100	N	N	N	N	90	60	60	90	90	120		90	120
Richard Indigo	ET14		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		90	120
William Lavender	ET15		90	90	90	90	75	75	100	75	60	90	60	90	60	60	90	90	120		O	O

Example 4. Attendance Record – Match (green flap)

Example Team

July 2013

Type of match			L	L	L	L	CL	L	C									
Type of surface			G	G	G	G	G	G	G									
Player name	Code	Date	4	8	12	17	21	24	28									
Fred White	ET01		90	90	90	90	90	90										
Stanley Black	ET02		AM	AM	45	70	90	90	90									
John Purple	ET03		90	70	90	90	90	90	15									
Steve Yellow	ET04		45	90	45		IM	30	90									
Vince Pink	ET05		75	90	90	90	90	90										
Brad Turquoise	ET06		90	90	N	90	90	60	45									
Mike Gray	ET07		90	90	90	90	80	45	90									
Gary Marine	ET08		45	45	90	30		90	30									
James Brown	ET09		90	90	30	90	10	45	60									
Christopher Blue	ET10		15	45	90	70	AM	AM	AM									
Daniel Orange	ET11		90	90	60	20	90	90	90									
Joseph Lime	ET12		90	20	90	90	90	90										
Robert Red	ET13		90	70	N	60	90	90	90									
Richard Indigo	ET14			20	90	20	90	70	45									
William Lavender	ET15		90	90	90	90	90	20	O									

Example Team

July 2013

National team training/match			Training sessions												Matches				
Type of surface			G	G	G										G				
Player name	Code	Date	13	13	14										15				
Fred White	ET01																		
Stanley Black	ET02																		
John Purple	ET03																		
Steve Yellow	ET04																		
Vince Pink	ET05																		
Brad Turquoise	ET06		90	90	90										90				
Mike Gray	ET07																		
Gary Marine	ET08																		
James Brown	ET09																		
Christopher Blue	ET10																		
Daniel Orange	ET11																		
Joseph Lime	ET12																		
Robert Red	ET13		90	90	90										90				
Richard Indigo	ET14																		
William Lavender	ET15																		

Name: Stanley Black

Code no: ET02

Team: Example Team

Date of injury: 02/07/2013

Date of return to full participation: 11/07/2013

(Send injury card even if player is still in rehabilitation)

Injured body part

- | | | |
|--|--|--|
| <input type="checkbox"/> Head/face | <input type="checkbox"/> Shoulder/clavicle | <input type="checkbox"/> Hip/groin |
| <input type="checkbox"/> Neck/cervical spine | <input type="checkbox"/> Upper arm | <input type="checkbox"/> Thigh |
| <input type="checkbox"/> Sternum/upper back | <input type="checkbox"/> Elbow | <input type="checkbox"/> Knee |
| <input type="checkbox"/> Abdomen | <input type="checkbox"/> Forearm | <input type="checkbox"/> Lower leg/Achilles tendon |
| <input type="checkbox"/> Lower back/pelvis | <input type="checkbox"/> Wrist | <input checked="" type="checkbox"/> Ankle |
| | <input type="checkbox"/> Hand/finger/thumb | <input type="checkbox"/> Foot/toe |

Injury side

- | | | |
|--------------------------------|--|--|
| <input type="checkbox"/> Right | <input checked="" type="checkbox"/> Left | <input type="checkbox"/> Bilateral/central |
|--------------------------------|--|--|

Type of injury

- | | | |
|--|---|---|
| <input type="checkbox"/> Concussion | <input type="checkbox"/> Lesion of meniscus/cartilage | <input type="checkbox"/> Haematoma/contusion/bruise |
| <input type="checkbox"/> Fracture | <input type="checkbox"/> Muscle rupture/tear/strain | <input type="checkbox"/> Abrasion |
| <input type="checkbox"/> Other bone injury | <input type="checkbox"/> Tendon injury/rupture/tendinitis | <input type="checkbox"/> Laceration |
| <input type="checkbox"/> Dislocation/subluxation | <input type="checkbox"/> Synovitis/effusion | <input type="checkbox"/> Nerve injury |
| <input checked="" type="checkbox"/> Sprain/ligament injury | <input type="checkbox"/> Overuse symptoms unspecified | <input type="checkbox"/> Dental injury |
| <input type="checkbox"/> Other type (specify): | | |

Diagnosis: Lateral ankle sprain (ATFL) grade I

Was this a re-injury?

- | | |
|--|---|
| <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes (give date of return from previous injury) |
|--|---|

Was the injury caused by overuse (gradual onset) or trauma (acute onset)?

- | | | |
|----------------------------------|--|---|
| <input type="checkbox"/> Overuse | <input checked="" type="checkbox"/> Trauma | <input type="checkbox"/> Not applicable |
|----------------------------------|--|---|

When did the injury occur?

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Training | <input type="checkbox"/> Match (min. of injury) | <input type="checkbox"/> Not applicable |
|--|---|---|

Indicate type of training or match where injury occurred

- | | |
|---|---|
| <input checked="" type="checkbox"/> Football training (F) | <input type="checkbox"/> Friendly match (F) |
| <input type="checkbox"/> Other training (O) | <input type="checkbox"/> League match (L) |
| <input type="checkbox"/> Football & other training (FO) | <input type="checkbox"/> Champions League match (CL) |
| <input type="checkbox"/> Reserve/youth team training (R) | <input type="checkbox"/> Europa League match (EL) |
| <input type="checkbox"/> National team training (N) | <input type="checkbox"/> Other Cup match (C) |
| | <input type="checkbox"/> Reserve/youth team match (R) |
| <input type="checkbox"/> Not applicable | <input type="checkbox"/> National team match (N) |

Was the injury caused by contact or collision?

- | | | |
|-----------------------------|--|---|
| <input type="checkbox"/> No | <input checked="" type="checkbox"/> Yes, with other player | <input type="checkbox"/> Yes, with object (specify) |
|-----------------------------|--|---|

Injury mechanism

- | | | | |
|--|--|---|---|
| <input type="checkbox"/> Running/sprinting | <input type="checkbox"/> Jumping/landing | <input type="checkbox"/> Hit by ball | <input type="checkbox"/> Kicked by other player |
| <input type="checkbox"/> Twisting/turning | <input type="checkbox"/> Falling/diving | <input type="checkbox"/> Collision | <input type="checkbox"/> Blocked |
| <input type="checkbox"/> Shooting | <input type="checkbox"/> Stretching | <input type="checkbox"/> Heading | <input type="checkbox"/> Use of arm/elbow |
| <input type="checkbox"/> Passing/crossing | <input type="checkbox"/> Sliding | <input checked="" type="checkbox"/> Tackled by other player | <input type="checkbox"/> Other acute mechanism |
| <input type="checkbox"/> Dribbling | <input type="checkbox"/> Overuse | <input type="checkbox"/> Tackling other player | <input type="checkbox"/> Unknown mechanism |

Injury mechanism: Tackled by teammate causing inversion trauma
(describe in own words)

Referee's Sanction:

(acute match injuries only)

- | | | |
|----------------------------------|--|--------------------------------------|
| <input type="checkbox"/> No foul | <input type="checkbox"/> Opponent foul | <input type="checkbox"/> Yellow card |
| | <input type="checkbox"/> Own foul | <input type="checkbox"/> Red card |

Examination

- | | | | |
|--|--|--|------------------------------|
| <input type="checkbox"/> Clinical only | <input type="checkbox"/> X-ray | <input type="checkbox"/> Ultrasonography | <input type="checkbox"/> MRI |
| <input type="checkbox"/> Arthroscopy | <input type="checkbox"/> Other (specify) | | |

Best guess as to why the injury occurred:

(medical teams opinion)

Other comments:

(e.g. specify if surgery was used)

Name: Christopher Blue

Code no: ET10

Team: Example team

Date of injury: 19/07/2013

Date of return to full participation: 10/09/2013

(Send injury card even if player is still in rehabilitation)

Location

☐ Anterior thigh ☒ Posterior thigh

Injury side

☐ Right ☒ Left ☐ Bilateral/central

Type of injury

☐ Haematoma/contusion/bruise ☒ Muscle rupture/tear/strain ☐ Tendon rupture/tendinopathy
☐ Nerve injury ☐ Overuse/hypertonia ☐ Other type

Injury classification

☐ Fatigue-induced muscle disorder ☐ Partial muscle injury - minor
☐ Delayed onset muscle soreness ☒ Partial muscle injury - moderate
☐ Neuromuscular muscle disorder – spine related ☐ Subtotal/complete muscle injury/tendinous avulsion
☐ Neuromuscular muscle disorder – muscle related

Was this a re-injury?

☐ No ☒ Yes (give date of return from previous injury): 10/12/2010

Was the injury caused by overuse (gradual onset) or trauma (acute onset)?

☐ Overuse ☒ Trauma ☐ Not applicable

When did the injury occur?

☒ Training ☐ Match (min. of injury) ☐ Not applicable (overuse injury)

Indicate type of training or match where injury occurred

☒ Football training (F) ☐ Friendly match (F)
☐ Other training (O) ☐ League match (L)
☐ Football & other training (FO) ☐ Champions League match (CL)
☐ Reserve/youth team training (R) ☐ Europa League match (EL)
☐ National team training (N) ☐ Other Cup match (C)
☐ Reserve/youth team match (R)
☐ National team match (N)
☐ Not applicable

Was the injury caused by contact or collision?

☒ No ☐ Yes, with other player ☐ Yes, with object (specify)

Injury mechanism

☒ Running/sprinting ☐ Jumping/landing ☐ Hit by ball ☐ Kicked by other player
☐ Twisting/turning ☐ Falling/diving ☐ Collision ☐ Blocked
☐ Shooting ☐ Stretching ☐ Heading ☐ Use of arm/elbow
☐ Passing/crossing ☐ Sliding ☐ Tackled by other player ☐ Other acute mechanism
☐ Dribbling ☐ Overuse ☐ Tackling other player ☐ Unknown mechanism

Injury mechanism: Sudden pain in left hamstrings when sprinting
(describe in own words)

Referee's Sanction

(acute match injuries only)

☐ No foul ☐ Opponent foul ☐ Yellow card
☐ Own foul ☐ Red card

Examination

☐ Clinical only ☐ X-ray ☐ Ultrasonography ☒ MRI (enclose MRI form)
☐ Other (specify)

Diagnosis (specify results of examination): Muscle tear proximal biceps femoris grade II verified with MRI

Treatment: PRICE, hydrotherapy, progressive lengthening and strength exercises

Was injection therapy used?

☒ No ☐ Yes (specify)

Best guess as to why the injury occurred:

(medical teams opinion)

Other comments:

(e.g. specify if surgery was used)

Name: Steve Yellow

Code no: ET04

Team: Example team

Date of illness debut: 21/07/2013

Date of return to full participation: 24/07/2013

(Send illness card even if player is still ill)

Type of illness

- ☐ Infection in airways (incl. influenza, common cold)
- ☐ Infection in other organs/body parts
- ☐ Asthma or allergies
- ☐ Stomach pain, diarrhea or bowel problems
- ☒ Headache, migraine, or nausea
- ☐ Unexplained fatigue, malaise or fever
- ☐ Other illness*

**If other illness, please select affected organ-system*

- ☐ Respiratory (other than infections and asthma)
- ☐ Cardiovascular
- ☐ Renal/urogenital/gynecological
- ☐ Metabolic/endocrinological
- ☐ Haematological
- ☐ Dermatological
- ☐ Neurological
- ☐ Psychiatric and behavioural
- ☐ Ophthalmic/otorhinolaryngological
- ☐ Dental
- ☐ Rheumatological/connective tissue disorder
- ☐ Immunological
- ☐ Environmental (including heat/altitude illness)
- ☐ Other

Recurrence: ☐ No

☒ Yes

Date of return to play after previous illness episode: 11/12/2012

Diagnosis:

Other comments:



UEFA Champions League Injury Study

Study Plan 2013-2014

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UCL Injury Study - overview

Background

Although the positive health effects of physical activity are well documented, sports participation is associated with a certain injury risk. The risk of injury in professional football is substantial and it has been estimated that the overall risk of injury is about 1,000 higher than for typical industrial occupations generally regarded as high-risk (Drawer & Fuller, 2002). Injuries also negatively affect performance and teams that can avoid injuries have greater success, as evaluated by their final position in the league system (Árnason et al., 2004; Ekstrand et al., 1983). Hence, prevention of injury in football should be of the utmost importance, and conducting an injury surveillance study is the fundamental first step in the process of prevention (van Mechelen et al., 1992).

In 2001, UEFA initiated a research project with the aim of reducing the number and severity of injuries in football, and consequently increasing the safety of players. This research project (led by Jan Ekstrand, vice-chairman of the UEFA Medical Committee and professor at Linköping University, Sweden) is the result of several years of work by the UEFA Medical Committee, and was preceded by discussions within UEFA in 1999 and 2000 concerning optimal study design and definitions.

The UEFA Champions League (UCL) Injury Study has been carried out over eleven seasons, with 30 European top level football clubs from 10 different countries having participated during this time. The data shows that a professional football team can expect about 50 injuries causing time-loss from play each season, equalling 2 injuries per player (Ekstrand et al., 2010). Even though half of these injuries are minor, where a player resumes full training and match play within one week, 37% are moderate (absence 1-4 weeks) and 16% are severe injuries which result in an absence of more than 4 weeks. The impact of injuries on team performance can thus be considerable, when on average, 12% of the squad is unavailable due to injury at any point during the season.

Data from elite football in Sweden suggests that the incidence and severity of injuries has not increased between the 1980's and 2000 (Hägglund et al., 2003) and injury risk has remained stable over consecutive seasons in the UCL study (Ekstrand et al., 2010). However, injury characteristics have changed somewhat, with a reduction in ankle sprain injury risk in elite football (Ekstrand, 2008).

The most common injury in modern professional football is a thigh muscle injury, typically affecting the hamstring (posterior) muscle group. Thigh muscle injuries represent about 17% of all injuries and a typical 25 player squad can thus expect 10 thigh muscle injuries each season, with 7 hamstring and 3 quadriceps injuries (Ekstrand et al., 2010). Thigh muscle injury also constitutes the most common severe injury type. Muscle and overuse injuries to the hip and groin are the second most common injury type, representing 14% of all injuries, and each season a club will sustain 7 groin injuries (Werner et al., 2009). Other common injuries are ligament sprains to the ankle (7% of all injuries,) and medial collateral ligament tears of the knee (MCL) (5% of all injuries,). The oftenhigh profile and problematic anterior cruciate ligament injury is less common (<1% of all injuries) (Waldén et al., 2011).

The second step in the sequence of injury prevention is to identify causal factors, i.e. the risk factors and mechanisms of injury, and from this information hypotheses for preventive interventions can be generated (van Mechelen et al., 1992). Injury causation is multifactorial, and ideally, one should collect information about intrinsic (player related) and extrinsic (environment related) risk factors, as well as the inciting event (mechanism) in injury occurrence, in order to identify the key factors for prevention (Meeuwisse, 1994).

Objective

The main objective of the study is to analyse the burden of injuries in European professional football with a validated injury surveillance system.

Specific purposes include:

- To analyse the injury risk and injury characteristics in professional football, to follow variations during and in-between consecutive seasons, and study time trends in injury risk
- To study the aetiology of injury occurrences, i.e. extrinsic and intrinsic risk factors and injury mechanisms
- To carry out specific sub-studies of “hot topics”, i.e. to provide in-depth analyses of specifically challenging injuries or risk factors, as suggested by the medical teams of the participating clubs
- To provide instant and regular feedback to the clubs with relevant data for the practitioner on the field, and to stimulate discussions on how to prevent injuries

The aim is to study some specific topics each season, always following suggestions from the clubs, which helps to reflect the needs and specific interests of those working in the field. During the coming season the study group will carry out in-depth studies of four injury types: thigh strains, ACL injuries, metatarsal fractures, and knee cartilage injuries.

Methodology

The following section contains a short methodology description. In addition, all clubs are provided with a detailed study manual describing the study procedure, including fictional scenarios and practical examples of how to complete the study forms.

The study is a prospective cohort study conducted over consecutive seasons and using a validated methodology and standard study protocols, thus enabling a comparison of injury risk and injury patterns with other studies. Data collection procedures follow the guidelines outlined by UEFA (Hägglund et al., 2005) and the consensus document for football injury studies (Fuller et al., 2006).

This year's study (2013/14) starts on 1 July 2013 and continues for the whole football season until 31 May 2014, including both the pre-season and competitive periods.

Contact person

Each club selects a team designate who will be responsible for collecting data from the club and forwarding the information to the study group (normally a member of the medical staff).

Inclusionary/exclusionary criteria

All players with a first team contract are included in the study. Payers who join the squad during the season are also included. Individual player consent will be collected according to the Declaration of Helsinki.

Study protocols

Four different forms are used in the study:

1. Declaration of Consent form
2. Attendance Record
3. Injury Card*
4. Illness Card

* In addition to the general Injury Card, there are specific injury cards that are filled in for certain injuries that are being investigated by the specific sub-studies (thigh muscle injuries, ACL-tears, metatarsal fractures, and cartilage injuries).

Declaration of Consent

The players should be informed about the study and agree to participate by signing an informed consent form. The Declaration of Consent form containing the name (and/or code), age, weight, height and dominant leg of each player should be returned to the study group as soon as possible.

Attendance Record

The clubs will be provided with Attendance Record forms in Excel format. The club contact person will be responsible for completing this form with data on the players' attendance and participation time in training sessions and matches. The attendance records should include all first team training sessions and matches, as well as participation by the players involved in national teams and reserve teams.

Definition of injury

Absence from training sessions and matches due to injury should be reported on the attendance record and an injury report form filled in. A recordable injury is defined as any injury that occurs during scheduled training sessions or matches and causes the player to interrupt the session or miss a following session.

Injury Card

Each injury should be recorded on a separate Injury Card. To simplify the procedure, the information on the Injury Card is restricted to a few questions about diagnosis, circumstance of injury, etc. The Injury Card is a "one-minute form", meaning that it should only take one minute to fill it in.

Definition of illness

A recordable illness episode is any physical or psychological complaint (distinct from injury) which results in the player being unable to participate fully in training or match play.

Illness Card

An Illness Card should be filled in for every illness that occurs during the study. The Illness Card is a “one-minute form”, meaning that it should only take one minute to fill it in.

Severity of injuries and illnesses

The severity of an injury or illness episode will be evaluated by the length of absence from football participation. The study group gathers this information from the Attendance Records.

Rehabilitation

A player is considered injured if he cannot fully participate in all aspects of collective training. He is considered fully rehabilitated when he has had clearance from the medical team for full participation in team training and availability for match selection.

Data collection

Attendance Records, Injury Cards and Illness Cards should be e-mailed to the study group (Håkan Bengtsson) on the last day of every month. Injury Cards, Illness Cards and Declaration of Consent form can also be sent by fax.

Confidentiality

All personal data will be kept confidential. The names of all the players involved in the study will be replaced by codes before computerising. It is also possible for the contact person in each club to replace the names of individual players with a code and to delete the players' names before sending in the different forms to the study group, should a club choose to do so.

Presentation of results and feedback to clubs

For each season of the study, all participating clubs will receive two reports (half season and post season) summarizing the results for their club together with the average for all participating clubs (without revealing other club names). Clubs can compare variations in injury incidence and characteristics during and in-between seasons and can obtain an objective evaluation of the effect of any preventive measures implemented in the club. This will enable club medical and coaching staff to work proactively with injury prevention. UEFA will be sent the same season reports with club names excluded.

In the scientific papers and presentations, no data for individual clubs will be presented unless the teams themselves agree to the publication of such data. Player specific data is not revealed.

The research team

The study is conducted by the Football Research Group (FRG) which is a team of experienced and established researchers based in Linköping, Sweden. The team consists of the following persons:

- Prof Jan Ekstrand, MD, PhD, vice chairman of the UEFA Medical Committee, team physician for the Swedish national football team for 120 caps during 1980-1997, wrote his thesis about “Football injuries and their prevention” in 1982
- Martin Hägglund, RPT, PhD, senior lecturer at Linköping University, wrote his thesis about “Epidemiology and prevention of football injuries” in 2007.
- Markus Waldén, MD, PhD, orthopaedic surgeon, wrote his thesis about “Epidemiology of injuries in elite football” in 2007.
- Håkan Bengtsson RPT MSc and Matilda Lundblad MD, contact persons for the study
- Karolina Kristenson, MD, PhD student, and Henrik Magnusson, MSc, statistical advisor

The FRG team has extensive experience of epidemiological studies in football. They have, on behalf of UEFA, conducted the UCL Injury Study since 2001, an artificial turf study during 2003-10, an injury audit of the English Premier League since 2011, and a UEFA European Championships study since 2004. The FRG group has also conducted injury surveillance studies on the male and female first leagues in Sweden during the last 10 years, as well as studies on amateur level leagues. The group has published about 30 articles about football injury epidemiology in international peer reviewed journals during the last 11 years.

References

Drawer S, Fuller CW. Evaluating the level of injury in English professional football using a risk based assessment process. Br J Sports Med 2002; 36: 446-451.

Árnason Á, Sigurdsson SB, Gudmundsson Á, et al. Physical fitness, injuries, and team performance in soccer. Med Sci Sports Exerc 2004; 36: 278-85.

Ekstrand J, Gillquist J, Möller M, et al. Incidence of soccer injuries and their relation to training and team success. Am J Sports Med 1983; 11: 63-7.

Mechelen Wv, Hlobil H, Kemper H. Incidence, severity, aetiology and prevention of sports injuries. Sports Med 1992; 14:82-99.

Meeuwisse WH. Assessing causation in sport injury: a multifactorial approach. Clin J Sports Med 1994; 4: 166-70.

Publications from the Football Research Group

1. Ekstrand J, Karlsson J. The risk for injury in football. There is a need for a consensus about definition of injury and the design of studies. *Scand J Med Sci Sports* 2003; 13: 147-9.

Summary: Presents a background to injury surveillance in football focusing on issues such as study design and definitions.

2. Hägglund M, Waldén M, Ekstrand J. Exposure and injury risk in Swedish elite football: a comparison between seasons 1982 and 2001. *Scand J Med Sci Sports* 2003; 13-6: 364-70.

Summary: The longterm development of injury risk was analysed in the Swedish top division. Training time had increased by 68% from 1982 to 2001 reflecting the transition from semi to full time professionalism. The injury risk had not increased during the same period.

3. Ekstrand J, Waldén M, Hägglund M. Risk for injury when playing in a national football team. *Scand J Med Sci Sports* 2004; 14-1: 34-8.

Summary: The injury risk in the Swedish national team was evaluated from 1991-1997. The injury risk was higher in matches lost compared to matches won. The overall level of injury was similar to that found at professional club level.

4. Ekstrand J, Waldén M, Hägglund M. A congested football calendar and the wellbeing of players: correlation between match exposure of European footballers before the World Cup 2002 and their injuries and performances during that World Cup. *Br J Sports Med* 2004; 38-4: 493-7.

Summary: The study analysed correlation between match exposure for professional footballers participating in UEFA Champions League study and their performances and injuries during the 2002 World Cup. Players that had a tight match schedule before the World Cup were more likely to underperform and sustain injuries in the World Cup.

5. Hägglund M, Waldén M, Ekstrand J. Injury incidence and distribution in elite football - a prospective study of the Danish and the Swedish top divisions. *Scand J Med Sci Sports* 2005; 15: 21-8.

Summary: Injury incidence and injury pattern were compared between the Swedish and Danish top divisions in the spring season of 2001. The pattern of injury was similar in both countries. Danish players had an increased risk of training injury and major injury, possibly reflecting the different seasonal dispositions in the two countries.

6. Waldén M, Hägglund M, Ekstrand J. Injuries in Swedish elite football - a prospective study on injury definitions, risk for injury and injury pattern during 2001. *Scand J Med Sci Sports* 2005; 15: 118-25.

Summary: Thigh muscle and groin injury were the most common causes of absence in the Swedish top division during 2001. Knee sprain was the most common major injury, causing absence from training and match play for more than four weeks.

7. Hägglund M, Waldén M, Bahr R, Ekstrand J. Methods for epidemiological study of injuries to professional football players: developing the UEFA model. *Br J Sports Med* 2005; 39: 340-6.

Summary: This paper outlines some methodological issues that are important when conducting an epidemiological study of football injuries and describes the development of the UEFA model.

8. Waldén M, Hägglund M, Ekstrand J. UEFA Champions League study: a prospective study of injuries in professional football during the 2001-2002 season. *Br J Sports Med* 2005; 39-8: 542-6.

Summary: Similar to the Scandinavian top divisions, thigh muscle injury, commonly affecting the hamstring complex, was the most frequent injury in the first season of the UEFA Champions League study. The study also revealed some regional differences in match injury incidence, where teams from northern Europe (England and the Netherlands) had a higher risk of injury than the teams from southern Europe (France, Italy and Spain), possibly due to poorer climate and surface conditions.

9. Waldén M, Hägglund M, Ekstrand J. High risk of new knee injury in elite footballers with previous anterior cruciate ligament injury. *Br J Sports Med* 2006; 40-2: 158-62.

Summary: This paper describes the incidence of ACL injuries at top level football and the increased risk of suffering a new knee injury, especially overuse injury, on return to elite football after an ACL injury.

10. Fuller CW, Ekstrand J, Junge A et al. Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. *Br J Sports Med* 2006; 40-3: 193-201.

Summary: This paper outlines the consensus reached by FIFA and UEFA concerning methodological issues that are important when conducting an epidemiological study of football injuries and describes the methods used in the UEFA Champions League studies.

11. Hägglund M, Waldén M, Ekstrand J. Previous injury as a risk factor for injury in elite football: a prospective study over two consecutive seasons. *Br J Sports Med* 2006; 40: 767-72.

Summary: In this paper we studied the Swedish top division over two seasons. We found that players that suffered a hamstring injury, groin injury or knee joint injury were two to three times more likely to suffer an identical injury in the subsequent season.

12. Ekstrand J, Timpka T, Hägglund M. The risk for injury when playing elite football on artificial turf versus natural grass – a prospective two-cohort study. *Br J Sports Med* 2006; 40: 976-80.

Summary: This paper analysed data from 10 men's clubs playing at home grounds with football turf during the period February 2003 to October 2005. The incidence of injury during training and match play did not differ between surfaces, being 2.42 vs. 2.94 injuries/1000 training hours and 19.60 vs. 21.48 injuries/1000 match hours when playing on artificial turf and grass, respectively.

13. Hägglund M, Waldén M, Ekstrand J. Lower reinjury rate with a coach-controlled rehabilitation programme in men's amateur soccer. A randomised controlled trial. *Am J Sports Med* 2007; 35: 1433-42.

Summary: Amateur football teams that followed an intervention programme consisting of controlled rehabilitation and set return to play criteria lowered the risk of re-injury by 75%.

14. Waldén M, Hägglund M, Ekstrand J. Football injuries during European Championships 2004-2005. *Knee Surg Sports Traumatol Arthroscop* 2007; 15: 1155-62.

Summary: The risk of injury was studied in the men's EURO 2004, the women's EURO 2005 and the men's U-19 championship 2005. The injury risk did not differ between tournaments. A high frequency of non-contact injuries was observed.

15. Ekstrand J. Epidemiology of football injuries. *Science & Sports* 2008; 2: 73-7.

Summary: This paper included data from the UCL and the Swedish first division cohorts and describes the most common and problematic injuries in professional football. The risk of ankle sprain has decreased by 50% compared to studies in the early 80.s. The association between injuries and performance was explored showing a negative correlation between severe injuries and performance determined by the final league position.

16. Hägglund M, Waldén M, Ekstrand J. Injuries in male and female elite football players. *Scand J Med Sci Sports* 2009; 19: 819-27.

Summary: The male and female top divisions in Sweden were followed during the 2005 season. Male players had an increased risk of training injury and match injury compared to female players, but the risk of sustaining a moderate to severe injury (>1 week absence) did not differ between men and women. Injury patterns were largely similar, but females suffered relatively more knee injuries, and men more groin injuries.

17. Hägglund M, Waldén M, Ekstrand J. UEFA Injury Study – an injury audit of European Championships 2006 to 2008. *Br J Sports Med* 2009; 43: 483-9.

Summary: Twelve European Championships (9 men, 3 women) were studied between 2006 and 2008. No difference in training injury incidence were seen between youth and adult tournaments, whereas match injury incidences increased with the level of play in men's tournaments, being highest in the men's EURO (41.6 injuries/1000 match h) followed by the men's U-21 (33.9/1000 h). Training injuries comprised 20% of all reported injuries and caused 26% of the match unavailability due to injury.

18. Werner J, Hägglund M, Waldén M, Ekstrand J. UEFA injury study: a prospective study of hip and groin injuries in professional football over seven consecutive seasons. *Br J Sports Med* 2009; 43: 1036-40.

Summary: This sub study of UEFA Injury Study recorded hip/groin injuries from 23 professional clubs, followed a varying number of seasons from 2001/02 to 2007/8. 628 hip/groin injuries were recorded, accounting for 12-16% of all injuries per season. The incidence over consecutive seasons was consistent. 53% were classified as moderate to severe. 41% of diagnosis relied on clinical examination.

19. Ekstrand J, Hägglund M, Waldén M. Injury incidence and injury pattern in professional football - the UEFA injury study. *Br J Sports Med* 2011;45: 553-558

Summary: 23 Professional football clubs were followed prospectively from 2001 to 2008 4,483 injuries were recorded during 566,000 h exposure resulting in injury a total incidence of 8.0 (27.5 match, 4.1 training), and the incidences were stable over seven seasons. The risk of injury increased with time in each half of matches.

20. Ekstrand J, Hägglund M, Fuller CW. Comparison of injuries sustained on artificial turf and grass by male and female elite football players. *Scand J Med Sci Sports*, 2011;21:824-832

Summary: 20 (15 male, 5 female) teams playing home matches on third-generation artificial turf were followed prospectively 2003-2008. Injury risk when playing on artificial turf was compared with natural grass. There was no difference in the nature of overuse injuries or incidence of acute injuries. During matches, male players were less likely to sustain quadriceps strain and more likely to sustain ankle sprain on artificial turf.

21. Waldén M, Hägglund M, Magnusson H, Ekstrand J. Anterior cruciate ligament injury in elite football: a prospective three-cohort study. *Knee Surg Sports Traumatol Arthrosc* 2011; 19: 11-19.

Summary: This three cohort study described the ACL injury characteristics in teams from Swedish men's and women's first leagues and several European men's professional leagues. The teams were followed a varying number of seasons from 2001-2009 (2,329 players) and during this period 78 ACL injuries occurred. Mean age at ACL injury was lower among women (20.6 vs 25.2 years). Female to male hazard ratio was 2.6, adjusted for age 2.1-2.4. Match-to-trainings ratio was 20.8. 58% of ACL injuries occurred due to non-contact mechanisms.

22. Waldén M, Hägglund M, Werner J, Ekstrand J. The epidemiology of anterior cruciate ligament injury in football (soccer): a review of the literature from a gender-related perspective. *Knee Surg Sports Traumatol Arthrosc* 2011; 19: 3-10.

Summary: 33 articles reporting gender specific ACL injury risk in football was reviewed. These show that female players have a 2-3 times higher ACL injury risk compared to their male counterparts. Females also tend to sustain their ACL injury at a younger age and have a higher risk for injury especially during match play, whereas no relevant gender-related difference seems to exist during training. Hence, age and activity should be adjusted for in future studies comparing ACL injury risk between genders.

23. Ekstrand J. A 94% return to elite level football after ACL surgery: a proof of possibilities with optimal caretaking or a sign of knee abuse? *Knee Surg Sports Traumatol Arthrosc* 2011; 19: 1-2.

Summary: The study by Waldén et al (21) shows that under ideal circumstances it is possible to achieve an outcome in excess of 90% in terms of return to football at the same high level as before the injury. The lay-off after an ACL injury is between 6-7 months even after optimal caretaking.

24. Ekstrand J, Torstveit M. Stress fractures in elite male football players. *Scand J Med Sci Sports* 2012;22: 341-6

Summary: A team of 25 players can't expect one stress fracture every third season. All fractures affected the lower extremities and 78% the fifth metatarsal bone. Stress fractures to the fifth metatarsal bone, tibia or pelvis caused absences of 3-5 months.

25. Ekstrand J, Hägglund M, Waldén M. Epidemiology of muscle injuries in professional football (soccer). *Am J Sports Med* 2011;39: 1226-32

Summary: Muscle injuries are a substantial problem for players and their clubs. They constitute almost one third of all time-loss injuries in men's professional football, and 92% of all injuries affect the 4 big muscle groups in the lower limbs.

26. Hägglund M, Zwerver J, Ekstrand J. Epidemiology of patellar tendinopathy in elite male soccer players. *Am J Sports Med* 2011;39: 1906-11

Summary: Although mainly mild in nature, patellar tendon injuries are fairly common in elite soccer and the recurrence rate is high. Exposure to artificial turf did not increase the prevalence or incidence of injury. Increased body mass and high total amount of exposure were identified as risk factors for patellar tendon injury.

27. Waldén M, Hägglund M, Orchard J, Kristenson K, Ekstrand J. Regional differences in injury incidence in European professional football. *Scand J Med Sci Sports* 2011. doi: 10.1111/j.1600-0838.2011.01409

Summary: This study suggests that there are regional differences in injury incidence of European professional football. Teams from the northern parts of Europe had higher incidences of injury compared to teams from more southern parts. In contrast, the anterior cruciate ligament injury incidence was lower in the northern European teams, especially for noncontact anterior cruciate ligament injury.

28. Ekstrand J, Healy J, Waldén M, Lee J, English B, Hägglund M. Hamstring muscle injuries in professional football: the correlation of MRI findings with return to play. *Br J Sports Med* 2012; 46:112-117

Summary: MRI can be helpful in verifying the diagnosis of a hamstring injury and to prognosticate layoff time. Radiological grading is associated with lay-off times after injury. Seventy per cent of

hamstring injuries seen in professional football are of radiological grade 0 or 1, meaning no signs of fibre disruption on MRI, but still cause the majority of absence days.

29. Ekstrand J. Playing too many matches is negative for both performance and player availability- results from the on-going UEFA injury study. Deutsche Zeitschrift fur Sportmedizin 2013; 64:163-167.

30. Hägglund M, Waldén M, Ekstrand J. Risk factors for lower extremity muscle injury in professional soccer: The UEFA injury study. Am J Sports Med 2013, Epub online

Summary: Previous identical injury was consistently found to be a risk factor for lower extremity muscle injury. In addition, previous injury to other muscle groups also increased injury rates, a finding not previously reported in soccer. This study also identified significant extrinsic risk factors for injury including part of the season, and match characteristics, with varying injury rates depending on match location and type of competition.

31. Nilsson M, Hägglund M, Ekstrand J, Waldén M. Head and Neck injuries in Professional Soccer. Clin J Sports Med 2013, Epub online

Summary: Head and neck injuries were relatively uncommon in professional soccer. Defender was the playing position most at risk. More than one-quarter of the concussed players returned to play before what is recommended in the consensus statements by the major sports governing bodies.