



# UEFA Champions League Injury Study

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*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 often high 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.