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ORIGINAL ARTICLE

Influence of the soccer players' professional status on the frequency and severity of injuries: A comparative pilot study

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KEYWORDS

Epidemiology;
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Abstract

Objective: The purpose of this study was to examine the frequency and severity of injuries sustained by members of a single soccer team over two seasons, when they played in the two divisions.

Methods: Comparative study between two levels of professional soccer: the Spanish First Division (FD), and Second Division (SD). The original sample consisted of professional players of the same team whose injuries were prospectively recorded over the 2006–7 (SD) and 2008–9 (FD) seasons.

Results: Of a total of 101 injuries registered, 64 (63.4%) were considered minor, 26 (25.7%) moderate, and 11 (10.9%) major. The incidence of moderate or major injuries during training was three times higher in FD (3.36 vs 1.01; RR=3.30), as was the total number of injuries during match play (52.82 vs 16.01; RR=3.30). As regards days lost, the incidence was higher in FD, in both training (60%) and matches (30%). The number of days lost per 1000 h exposure was 50% higher in FD (129.60 vs 85.01 days/1000 h exposure).

Conclusions: The results show that in Spanish football, professional status may be a determining factor as regards injuries. These findings also confirm the fact that workplace injury risk is considerably higher in professional football than in most other sectors. It would therefore appear that clubs should take stock of the importance of developing injury prevention strategies, and use their financial resources to reduce the overall risk to clubs and players.

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PALABRAS CLAVE

Epidemiología;
Fútbol;
Lesiones deportivas

Influencia del estatus profesional de los jugadores de fútbol en la frecuencia y gravedad de las lesiones: estudio piloto comparativo**Resumen**

Objetivo: El propósito del estudio es evaluar la frecuencia y la gravedad de las lesiones sufridas en un mismo equipo de fútbol durante 2 temporadas en 2 divisiones.

Métodos: Estudio comparativo entre 2 estatus de fútbol profesional: Primera División (PD) y Segunda División (SD). La muestra consistió en jugadores profesionales de un mismo equipo cuyas lesiones se registraron prospectivamente durante las temporadas 2006-2007 (SD) y 2008-2009 (PD).

Resultados: De las 101 lesiones registradas, 64 (63,4%) fueron consideradas leves, 26 (25,7%) moderadas y 11 (10,9%) graves. La incidencia de lesiones moderadas o graves durante el entrenamiento fue 3 veces mayor en la PD (3,36 vs 1,01; RR=3,30), así como el total de lesiones durante el partido (52,82 vs 16,01; RR=3,30). En cuanto a los días de baja, la incidencia fue mayor en PD, tanto en entrenamientos (60%) como en partidos (30%). El número de días perdidos por cada 1.000 h de exposición fue un 50% mayor en PD (129,60 vs 85,01 días/1.000 h de exposición).

Conclusiones: Los resultados obtenidos muestran que en el fútbol español el estatus profesional puede ser un factor determinante de las lesiones. Además, estos resultados confirman el hecho de que el riesgo de lesión en el lugar de trabajo es considerablemente más alto en el fútbol profesional que en la mayoría de los demás sectores. Sería necesario que los clubes analizaran la importancia de desarrollar estrategias de prevención de lesiones y usaran recursos financieros para reducir el riesgo.

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Introduction

Association Football, or Soccer, is the world's most popular sport, with approximately 200,000 professional and 240 million amateur players.¹ This popularity has aroused a growing interest in soccer-related injuries, a great deal of research having been carried out over the past few years into risk factors, preventive strategies, management, incidence and severity.² Among potential risk factors identified are the football calendar,³ playing surface,⁴ physical effort,⁵ and players' skill proficiency.⁶ However, to the author's knowledge, little comparative evidence has been recorded regarding the influence of a team's competition status (league or division) on injury rate.

In Spain, the top two professional divisions have marked financial differences, a factor affecting sporting performance as well as the level of the teams.⁷ Traditionally, it has been observed that in the second division the game is strongly based on physical effort and less on technical skills, while the playing surfaces are usually less even. Thus, it could be hypothesized that there is a greater risk of injury for a second division player than for a first division one.

This study examines the frequency and severity of injuries sustained by the same soccer team over two consecutive seasons when it played in the two divisions, before and after promotion.

Methods**Subjects**

This is a comparative study between two levels of professional soccer: the Spanish First Division (FD), and Second Division (SD). The original sample consisted of professional

players of the "Real Sporting de Gijón Sociedad Anónima Deportiva" whose injuries were prospectively recorded over the 2006-7 (SD) and the 2008-9 (FD) seasons. All players gave written consent.

Procedure

All injuries were diagnosed by the club's medical staff and recorded by their senior physiotherapist on a specific injury report form designed for the study. The definitions and data collection procedures used followed the recommendations of the consensus statement for football injury studies.²

A recordable injury was defined as an injury received during competition or training that prevented the player from participating in competition or normal training for at least one day. Training exposure was defined as any physical activity carried out under the supervision of the team coach. Match exposure for players participating included all matches in which the team took part during the seasons considered. Injuries were categorized as "minor" (one to seven days), "moderate" (eight to twenty-eight days) and "major" (over twenty-eight days), based on the real (not estimated) length of time that the player took to recover and resume playing. Each injury was also classified according to its nature, location and mechanism or cause. Finally, we collected information on the laterality of the injuries, player position and days lost as a result.

Statistical analysis

The primary outcome measure was injury incidence (injuries/1000h of exposure) in training and match play. Secondary outcomes included injury severity and incidences of various injury types. We calculated relative risks (RR) with

Table 1 Distribution of injuries according to the variables analyzed.

Injuries	Minor		Moderate		Major		Totals	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Type</i>								
Strained muscles	25	39.1	17	65.4	5	45.5	47	46.5
Sprains	18	28.1	4	15.4	2	18.2	24	23.8
Contusions	21	32.8	4	15.4	1	9.1	26	25.7
Fractures	0	0	1	3.8	3	27.3	4	4.0
<i>Cause</i>								
Traumatic	35	54.7	19	73.1	10	90.9	64	63.4
Overload	29	45.3	7	26.9	1	9.1	37	36.6
<i>Place</i>								
Head, face and neck	5	7.8	0	0	2	18.2	7	6.9
Upper limb	5	7.8	1	3.8	1	9.1	7	6.9
Trunk	10	15.6	5	19.2	0	0	15	14.9
Lower limb	44	68.8	20	76.9	8	72.7	72	71.3
<i>Laterality</i>								
Right	32	50	8	30.8	7	63.6	47	46.5
Left	18	28.1	14	53.8	3	27.3	35	34.7
No laterality	14	21.9	4	15.4	1	9.1	19	18.8
<i>Position</i>								
Goalkeeper	4	6.3	1	3.8	1	9.1	6	5.9
Defence	20	31.3	7	26.9	5	45.5	32	31.7
Midfield	15	23.4	9	34.6	1	9.1	25	24.8
Striker	25	39.1	9	34.6	4	36.4	38	37.6
<i>Total</i>	64	63.4	26	25.7	11	10.9	101	

95% confidence intervals to compare the incidence of injury between first and second division and by other variables. We also analyzed the incidence of days lost for each season and variable studied.

Statistical analysis was carried out by calculating proportions in the case of qualitative variables and by using the chi squared test for detecting significant differences. For quantitative variables, the mean, median, standard deviation, range and interquartile range was calculated and to detect significant differences was used ANOVA for normality and equal variance and the nonparametric Kruskal-Wallis test in case otherwise.

Results

In the seasons studied, 14 players played only in the second division, 15 only in the first and 11 in both, making a final sample of 40 players (mean age 25.8 ± 4.7 years).

Table 1 shows the distribution of injuries according to the variables studied. Of a total of 101 injuries, 64 (63.4%) were considered minor, 26 (25.7%) moderate and 11 (10.9%) major. The most frequent ones were sprains and strained muscles, which together made up 46.5% of the total recorded. The most common cause was traumatic, which accounted for almost two thirds of the total, the area most frequently affected being the legs.

Table 2 shows the distribution of the incidence of injuries and days lost by type of injury, category and circumstances. Our results appear to indicate a greater incidence of injuries

in FD than in SD, in both training and playing, along with more days lost per injury. The incidence of moderate or major injuries during training was three times higher in FD (3.36 vs 1.01; RR = 3.30), as was the total of injuries during match play (52.82 vs 16.01; RR = 3.30). Altogether, total incidence of major or moderate injuries was three times higher in FD and accounted for 61% of all injuries (Table 2). Regarding days lost, the incidence was higher in FD in both training (60%) and matches (30%), the number of days lost per 1000 h exposure being 50% higher in FD (129.60 vs 85.01 days/1000 h exposure).

Table 3 shows the distribution of the incidence of injuries for each of the variable studied by division, with a noticeably higher frequency of injuries to the legs, sprains and traumatic injuries in FD.

Discussion

The aim of this study was to analyze the incidence of injuries in a single professional football team and compare the influence on it of the players' professional status (FD or SD). Very few studies have analyzed injury incidence among the players of a single team in different divisions, so the methodology used and the results obtained may be a useful basis for future research of this type.

Overall, our results agree with previous findings regarding a professional footballer's injury profile, confirming the lower limbs as the area most frequently injured,^{8,9} that the most common injuries are sprains and strained muscles^{10,11}

Table 2 Distribution of the incidence of injuries and days lost by type of injury, category and circumstances.

Training							
Division (h)	First division (4460)		Second division (5912)		RR	IC 95%	p-Value
	<i>n</i>	<i>I</i> × 1000 h	<i>n</i>	<i>I</i> × 1000 h			
Major injuries	2	0.45	3	0.51	0.88	0.07–7.71	0.890
Major or moderate injuries	15	3.36	6	1.01	3.31	1.29–8.54	0.009
Total injuries	23	5.16	34	5.75	0.90	0.53–1.52	0.690
Total days lost	314	70.41	262	44.32	1.59	1.35–1.87	<0.0001

Playing							
Division (h)	First division (625)		Second division (687)		RR	IC 95%	p-Value
	<i>n</i>	<i>I</i> × 1000 h	<i>n</i>	<i>I</i> × 1000 h			
Major injuries	2	3.20	4	5.82	0.55	0.05–3.83	0.480
Major or moderate injuries	11	17.61	5	7.28	2.42	0.77–8.88	0.090
Total injuries	33	52.82	11	16.01	3.30	1.67–6.52	0.0003
Total days lost	345	552.16	299	435.12	1.27	1.35–1.87	0.0026

Total							
Division (h)	First division (5085)		Second division (6599)		RR	IC 95%	p-Value
	<i>n</i>	<i>I</i> × 1000 h	<i>n</i>	<i>I</i> × 1000 h			
Major injuries	4	0.79	7	1.06	0.74	0.16–2.92	0.630
Major or moderate injuries	26	5.11	11	1.67	3.07	1.52–6.21	0.001
Total injuries	56	11.01	45	6.82	1.61	1.09–2.39	0.016
Total days lost	659	129.60	561	85.01	1.52	1.36–1.71	<0.0001

Bold values are statistical significant date.

Table 3 Distribution of the incidence of injuries by division.

Division (h)	FD (5085)		SD (6599)		RR	IC 95%	p-Value
	<i>n</i>	<i>I</i> × 1000 h	<i>n</i>	<i>I</i> × 1000 h			
Laterality right	21	4.13	26	3.94	1.05	0.59–1.86	0.870
Laterality not right	35	6.88	19	2.88	2.39	1.37–4.18	0.002
Strained muscles	31	6.10	16	2.42	2.51	1.37–4.60	0.002
Not strained muscles	25	4.92	29	4.39	1.12	0.66–1.91	0.680
Lower limb	40	7.87	32	4.85	1.62	1.02–2.58	0.039
Not lower limb	16	3.15	13	1.97	1.6	0.77–3.32	0.210
Traumatic	37	7.28	27	4.09	1.78	1.08–2.92	0.020
Overload	19	3.74	18	2.73	1.37	0.77–2.61	0.340

Bold values are statistical significant date.

and that over half of the injuries are minor.¹² It was also demonstrated that injuries were more frequently sustained on a players’ dominant side and more probably during matches.¹³ The injury incidence for the group of footballers studied was 8.65/1000 h exposure, very similar to the 8/1000 h reported by Ekstrand et al. in a recent prospective study in which 23 top European clubs were monitored over nine seasons.¹⁴ Here it should be stressed that the incidence of injuries in professional football fluctuates with the context and time of the study. For example, Dauty et al., in a recently published study, found an incidence of 4.7/1000 h after monitoring a single team of the French Ligue 1 for 15 years.¹⁵ However, one of the latest meta-analyses

published on the epidemiology of professional male football injuries shows that injury incidence may be established at around 6.2/1000 h.¹⁶

Comparing the influence of professional status, the data gathered here clearly show FD to present a higher injury risk than SD. A priori, this is a surprising result, for it is normally assumed that lower-status players with less technical skill may be less physically fit and that their playing fields may also be worse. Nevertheless, although skill is known to be a determining factor in football injuries⁶, recent scientific evidence also indicates that more skilled players would appear to have more likelihood of suffering injury.¹⁷ On the other hand, data also show that in Spanish football

there is no difference between the divisions in the way that the technical staff train the players or in their injury prevention.¹⁸ Nor have differences been found in players' fitness levels.^{19,20} It should be added that Spanish football grounds are subject to the same maintenance rules whatever the division.

In the light of this, it could be argued that FD players sustain more injuries because of their fixture list, which is usually tighter, while the aims may mean more stress for players. Nevertheless, some studies would indicate that it is not always the players who play in most matches that are at the greatest risk of being injured.¹⁴ It should also be pointed out that overall football exposure was higher in SD. The influence of professional status on the risk of injury is still, therefore, a controversial topic. Hawkins et al. found no differences in their injury analysis between the English Premier League and Championship.¹³ On the other hand, Nielsen et al. showed that injury incidence, pattern of injury, and traumatology varied among Swedish players participating at different levels of competition.²¹ In this regard, further research is needed.

A topic that has been largely overlooked in the epidemiology of injuries in professional football is the true level of risk. The cost of treatment and loss of production through time off work have been estimated at about £1 billion each year in Britain alone²² so it is important to take into account the number of days that a player is absent from work as a result of an injury. It has, in fact, been reported that the percentage of muscle injuries sustained by footballers means over 300 man-days lost per season for a professional team,²³ which our study bears out regardless of the division. This confirms the fact that workplace injury risk is considerably higher in professional football than in most other sectors.²⁴

The results of this study should be interpreted in the light of certain limitations. Firstly, only two seasons were studied, one in each division, so an element of chance may be present. Secondly, the different objectives of each team, promotion, relegation or staying in a given division, are important. Finally, the composition of the team was different in the two seasons, including a new coach. This is of crucial importance, as the style of play may have altered (not mentioned in the study) and this may have influenced the frequency of injuries. Future research is therefore necessary, involving a longer period of monitoring and more teams, to confirm our findings.

Conflict of interests

Authors declare that they don't have any conflict of interests.

References

1. FIFA communications Division. The Big Count Statistical Package. FIFA Communications Division 31/5/07; 2007. Available at: http://www.fifa.com/mm/document/fifafacts/bcoffsurv/bigcount.statspackage_7024.pdf
2. Fuller CW, Ekstrand J, Junge A, Andersen TE, Bahr R, Dvorak J, et al. Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. *Scand J Med Sci Sports*. 2006;16:83-92.
3. Carling C, Le Gall F, Dupont G. Are physical performance and injury risk in a professional soccer team in match-play affected over a prolonged period of fixture congestion? *Int J Sports Med*. 2012;33:36-42.
4. Bjørneboe J, Bahr R, Andersen TE. Risk of injury on third-generation artificial turf in Norwegian professional football. *Br J Sports Med*. 2010;44:794-8.
5. Carling C, Gall F, Reilly T. Effects of physical efforts on injury in Elite Soccer. *Int J Sports Med*. 2010;31:180-5.
6. Peterson L, Junge A, Chomiak J, Graf-Baumann T, Dvorak J. Incidence of football injuries and complaints in different age groups and skill-level groups. *Am J Sports Med*. 2000;28:5-51-7.
7. Barajas A, Fernández-Jardón C, Crolley L. Does sports performance influence revenues and economic results in Spanish football. In: MPRA Paper; 2005.
8. Wong P, Hong Y. Soccer injury in the lower extremities. *Br J Sports Med*. 2005;39:473-82.
9. Noya J, Sillero M. Incidencia lesional en el fútbol profesional español a lo largo de una temporada: días de baja por lesión. *Apunts Med Esp*. 2012;47:115-23.
10. Dvorak J, Junge A, Derman W, Schweltnus M. Injuries and illnesses of football players during the 2010 FIFA World Cup. *Br J Sports Med*. 2011;45:626-30.
11. Ekstrand J, Hägglund M, Waldén M. Epidemiology of muscle injuries in Professional Football (Soccer). *Am J Sports Med*. 2011;39:1226-32.
12. Hawkins R, Hulse M, Wilkinson C, Hodson A, Gibson M. The association football medical research programme: an audit of injuries in professional football. *Br J Sports Med*. 2001;35:43-7.
13. Hawkins RD, Fuller CW. A prospective epidemiological study of injuries in four English professional football clubs. *Br J Sports Med*. 1999;33:196-203.
14. 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;38:493-7.
15. Dauty M, Collon S. Incidence of injuries in French professional soccer players. *Int J Sports Med*. 2011;32:965-9.
16. Llana S, Pérez P, Lledó E. The epidemiology on soccer: a systematic review. *Rev Int Med Cienc Act Fís Deporte*. 2010;10:22-40.
17. Soligard T, Grindem H, Bahr R, Andersen TE. Are skilled players at greater risk of injury in female youth football? *Br J Sports Med*. 2010;44:1118-23.
18. Zahinos J, González C, Salinero J. Epidemiological study of the injuries, the processes of readaptation and prevention of the injury of anterior cruciate ligament in the professional football. *J Sport Health Res*. 2010;2:139-50.
19. Arnason A, Sigurdsson SB, Gudmundsson A, Holme I, Engebretsen L, Bahr R. Physical fitness, injuries, and team performance in soccer. *Med Sci Sports Exerc*. 2004;36:275-8.
20. Cometti G, Maffiuletti N, Pousson M, Chatard JC, Maffulli N. Isokinetic strength and anaerobic power of elite, subelite and amateur French soccer players. *Int J Sports Med*. 2001;22:45-51.
21. Nielsen AB, Yde J. Epidemiology and traumatology of injuries in soccer. *Am J Sports Med*. 1989;17:803-7.
22. Hoogendoorn WE, Van Poppel MNM, Bongers PM, Koes BW, Bouter LM. Physical load during work and leisure time as risk factors for back pain. *Scand J Work Environ Health*. 1999;25:387-403.
23. Valle X. Clinical practice guide for muscular injuries: epidemiology, diagnosis, treatment and prevention. *Br J Sports Med*. 2011;45:e2.
24. Drawer S, Fuller C. Evaluating the level of injury in English professional football using a risk based assessment process. *Br J Sports Med*. 2002;36:446-51.