

Spor yaralanmalarının görülme sıklığı ve maliyeti

Epidemiyoloji

- Toplumdaki hastalık, kaza ve sađlık ile ilgili durumların dađılımını, grlme sıklıklarını ve bunları etkileyen belirteçleri inceleyen bir tıp bilimi dalıdır.
- Sađlığı geliřtirmek ve hastalıkları/yaralanmaları azaltmak için sađlık bilgilerini toplamak, yorumlamak ve kullanmak bu bilim dalının amaçlarındandır.
- Epidemiyolojik veri toplama spor yaralanmalarını nleme alıřmalarının ilk ařamasıdır.

İnsidans

Spor yaralanmalarının görülme sıklığı

- Bir toplum veya toplumun bir kısmında bir hastalığın yaygın bir göstergesi “İnsidans”tır.
- İnsidans aynı zamanda bir risk hesabı da verir.
- Eğer biz hesaplanan rakamı 100 ile çarparsak % olarak hızları yada görülme sıklığını elde ederiz.

Veri toplama yöntemi önemlidir

- Veri nasıl toplandı ?
 - Retrospektif
 - Prospektif
- Veri toplama aracı nedir?
 - anket, kayıt, internet, sms
- Kim topladı ?
 - Hekim, sağlık ekibi, sporcu, antrenör vs.
- Nasıl ifade edildi ?
 - Sporcu başına, antrenman saati başına, maç-yarışma saati başına, maç-antrenman başına
 - 1000 saat antrenman/maç süresi başına ifade etmek yaygındır
- Görülme sıklığı nasıl hesaplandı

Uzun süreli istatistik...

- Sağlıklı bir istatistiksel araştırma çok sayıda olguya ait bilgilerin uzun süreli ve doğru olarak toplanabilmesine bağlıdır.
- Ayrıca,
 - ülkede spor yapanların sayısı,
 - bunların yaş ve cinsiyeti,
 - sportif etkinliklerin yaygınlığı, şekli, yarışma koşulları,
 - antrenman durumu,
 - çevresel koşullar (iklim, zemin, saha gereç vb.) istatistiksel bilgilerin değerlendirilmesinde önemli olan faktörlerdir.
- Ülkemizde bu konuda spora katılımıla ortaya çıkan yaralanmalara ait yeterli sayıda ulusal istatistikler, epidemiyolojik veriler bulunmamaktadır.

Spor Dallarının Sınıflandırılması (I.O.C.)

<u>YÜKSEK RİSK</u>	<u>ORTA RİSK</u>	<u>DÜŞÜK RİSK</u>
Maraton, yürüyüş	Atletizm (maraton hariç)	Okçuluk
Sırıkla atlama	Biatlon	Atıcılık
Boks	Kros kayağı	Masa tenisi
Judo	Kano	Yüzme
Güreş	Kürek	Senkronize yüzme
Su topu	Yelken	
Dalma	Basketbol	
Bisiklet	Voleybol	
Futbol	Bedminton	
Çim hokeyi	Tenis	
Eskrim		
Jimnastik		
Alp kayağı		
Buz hokeyi		
Kayak atlama		
Halter		
Buz pateni		

Subject-related risk factors for sports injuries: a 1-yr prospective study in young adults

WILLEM VAN MECHELEN, JOS TWISK, ALEXANDER MOLENDIJK, BERTEL BLOM, JAN SNEL, and HAN C. G. KEMPER

EMGO Institute, Faculty of Medicine, Vrije Universiteit, NL-1081 BT Amsterdam, THE NETHERLANDS; and Department of Psychonomics, Faculty of Psychology, University of Amsterdam, THE NETHERLANDS

TABLE 3. Type of sports activity, exposure time, number of injuries sustained during the 12-month period of follow-up, and incidence rates per 1000 h of exposure time (95% CI).

Sports Activity	Exposure Time (h)	No. of Injuries	Incidence Rate (95% CI)
Contact sports	2277	25	11.0 (7.4–16.3)
Noncontact sports	11388	26	2.3 (1.6–3.3)
Training	3869	11	2.8 (1.6–5.1)
Games/competition	1566	21	13.4 (8.7–20.6)
Unorganized sports	8085	19	2.4 (1.5–3.7)

- Temas sporlarında yaralanma daha fazladır
- Yarışma sporlarında yaralanmalar rekreasyonel etkinliklerden daha sık görülmektedir.
- Antrenör gözetiminde olmayan sporlara katılımda risk daha yüksektir.

Olimpiyat Oyunları 2004



- 2004 te takım sporlarında maç başına 0,8 yaralanma
 - (men's and women's football,
 - men's and women's handball,
 - men's and women's basketball,
 - men's and women's field hockey, baseball, softball,
 - men's and women's water polo, and
 - men's and women's volleyball).
- Yaralanmaların yarısı alt ekstremitte, %24 baş ve boyun.
- En sık rastlanan baş kontüzyob, ayak bileği burkulması,
- % 52 si spora katılımı engellemiş
- En yaygın yaralanma sebebi diğer oyuncu ile temas (%78)

Olimpiyat Oyunları 2008



- 1000 sporcuda 96.1 yaralanma,
- % 50 spora katılımı engelliyor,
- Çoğunluğu (% 75) yarışma esnasında oluşmuş,
- Üçte biri diğer oyuncu ile temas, % 22 si aşırı kullanım, %20 temas olmaksızın yaralanma
- Şu sporlarda daha yüksek;
 - futbol, tekvando, hokey, hentbol, halter, box
- Şu sporlarda daha düşük;
 - yelken, kano kayak, kürek, senkronize yüzme, dalma, eskrim, ve yüzme

2012 Londra



- 1000 sporcuda 128.8 yaralanma (%12,8)
- % 35 i spora katılımı engellemiş
- Yaralanma mekanizması;
 - % 25 aşırı kullanım,
 - % 20 temassız travma
 - % 14 temas sonucu oluşan travma
 - % 12 sabit nesneye çarpma ile oluşan travma

- En yüksek yaralanma riski;
 - Tekwando
 - Futbol
 - BMX
 - Hentbol
 - Dağ bisikleti
 - Atletizm
 - halter
 - Hokey
 - Bedminton
- En düşük yaralanma riski;
 - Okçuluk
 - Kano
 - Bisiklet
 - Kürek
 - Atıcılık ve eskrim

Sports injuries and illnesses during the London Summer Olympic Games 2012

In total, 10 568 athletes took part in the London Olympic Games. Of these, 4676 were women (44%) and 5892 men (56%).

Among these athletes, we recorded a total of 1361 injuries, equalling an overall injury rate of 128.8 injuries per 1000 registered athletes (table 1). On average, 11% of the athletes sustained at least one injury (n=1190). There were 114, 18 and 7 athletes with two, three and four injuries, respectively. The risk of an athlete to be injured was the highest in taekwondo, football, BMX, handball, mountain bike, hockey, weightlifting, athletics and badminton (15–39% of registered athletes were affected in each sport). The relative injury risk was the lowest for archery, canoe slalom and sprint, track cycling, rowing, shooting and equestrian (less than 5% of the athletes were

Table 1 Rates of overall injuries, injuries leading to time loss (≥ 1 or >7 days of estimated absence), competition and training injuries and overall illnesses in the Olympic sports

Olympic sport	Athletes (n)	Injuries			Competition	Training	All illnesses
		All	≥ 1 day	>7 days			
Archery	128	2 (1.6)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	10 (7.8)
Athletics	2079	368 (17.7)	145 (7.0)	59 (2.8)	132 (39.5)	204 (60.5)	219 (10.5)
Aquatics							
Diving	116	11 (8.1)	5 (3.7)	2 (1.5)	7 (75.0)	8 (75.0)	7 (5.1)
Swimming	931	50 (5.4)	7 (0.8)	1 (0.1)	13 (31.0)	29 (67.0)	66 (7.3)
Synchronised swimming	104	14 (13.5)	4 (3.8)	0 (0.0)	2 (20.0)	8 (80.0)	13 (12.5)
Water polo	260	34 (13.1)	13 (5.0)	0 (0.0)	26 (78.8)	7 (21.2)	21 (8.1)
Badminton	164	26 (15.9)	7 (4.3)	4 (2.4)	11 (41.8)	12 (52.3)	5 (3.0)
Badminton	787	37 (11.1)	10 (3.5)	7 (2.4)	21 (75.0)	7 (75.0)	9 (3.1)
Beach volleyball	56	12 (12.5)	2 (2.1)	0 (0.0)	6 (54.5)	5 (45.5)	18 (18.8)
Boxing	283	26 (9.2)	9 (3.2)	1 (0.4)	16 (72.7)	6 (27.3)	18 (6.4)
Canoe slalom	83	2 (2.4)	1 (1.2)	0 (0.0)	0 (0.0)	2 (100.0)	4 (4.8)
Canoe sprint	249	7 (2.8)	1 (0.4)	0 (0.0)	3 (50.0)	3 (50.0)	14 (5.6)
Cycling							
BMX	48	15 (31.3)	5 (10.4)	2 (4.2)	11 (73.3)	4 (26.7)	2 (4.2)
MTB	76	16 (21.1)	8 (10.5)	2 (2.6)	5 (31.3)	11 (68.7)	5 (6.5)
Road	710	19 (9.0)	7 (3.3)	2 (0.9)	14 (73.7)	5 (26.3)	7 (3.3)
Track	167	5 (3.0)	3 (1.8)	0 (0.0)	1 (20.0)	4 (80.0)	16 (9.6)
Equestrian	159	9 (4.5)	4 (2.0)	2 (1.0)	6 (100.0)	0 (0.0)	11 (5.5)
Fencing	246	23 (9.3)	10 (4.1)	2 (0.8)	10 (45.5)	12 (54.5)	13 (5.3)
Football	509	179 (35.2)	67 (13.2)	11 (2.2)	132 (74.2)	46 (25.8)	52 (12.2)
Gymnastics							
Artistic	155	15 (7.7)	8 (4.1)	4 (2.1)	8 (66.7)	4 (33.3)	5 (2.6)
Rhythmic	56	7 (7.3)	1 (1.0)	0 (0.0)	1 (16.7)	5 (83.3)	1 (1.0)
Trampoline	32	2 (6.3)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	1 (3.1)
Handball	549	76 (21.8)	32 (9.2)	16 (4.6)	55 (75.5)	18 (24.7)	17 (4.9)
Hockey	388	66 (17.0)	25 (6.4)	10 (2.5)	44 (71.0)	18 (29.0)	25 (7.5)
Judo	383	47 (12.3)	22 (5.7)	12 (3.1)	26 (68.4)	12 (31.6)	10 (4.2)
Modern pentathlon	72	6 (8.3)	2 (2.8)	0 (0.0)	3 (60.0)	2 (40.0)	1 (1.4)
Rowing	549	18 (3.3)	2 (0.4)	0 (0.0)	7 (53.8)	6 (46.2)	40 (7.3)
Sailing	380	36 (14.7)	3 (0.8)	1 (0.3)	30 (82.5)	18 (57.5)	38 (10.0)
Shooting	350	15 (3.8)	4 (1.0)	0 (0.0)	1 (7.1)	13 (92.9)	17 (4.4)
Table tennis	174	11 (6.3)	7 (4.0)	2 (1.1)	7 (70.0)	3 (30.0)	12 (6.9)
Taekwondo	128	50 (35.1)	16 (12.5)	7 (5.5)	16 (33.3)	32 (66.7)	14 (10.9)
Tennis	164	21 (11.4)	7 (3.8)	4 (2.2)	14 (66.7)	7 (33.3)	4 (2.2)
Triathlon	110	16 (14.5)	8 (7.3)	3 (2.7)	11 (73.5)	4 (26.5)	7 (6.4)
Volleyball	788	20 (6.9)	7 (2.4)	3 (1.0)	11 (55.0)	9 (45.0)	8 (2.8)
Weightlifting	252	44 (17.5)	19 (7.5)	11 (4.4)	18 (45.0)	22 (55.0)	10 (4.0)
Wrestling	343	41 (12.0)	11 (3.2)	6 (1.7)	20 (62.5)	12 (37.5)	16 (4.7)
Total	10568	1361 (12.9)	487 (4.6)	174 (1.6)	684* (54.9)	461* (35.1)	758 (7.2)

Values are numbers (percentages) of injured or ill athletes, unless otherwise indicated.

*Information on training/competition is missing in 116 injuries.

Table 1.2 Injuries during the international athletics championships

	Incidence of injuries per 1000 registered athletes	Percentage of time-loss injuries	Main diagnosis	Main causes	Events with higher injury risk
World and OG	109	49	Thigh (hamstring) strain	Overuse	Combined events, marathon, middle and long distances
European	65	47	Thigh (hamstring) strain	Overuse	Combined events, middle and long distances
Indoor	69	39	Thigh (hamstring) strain	Overuse and noncontact trauma	Combined events and long distances

Data from 14 athletics championships from 2007 to 2014

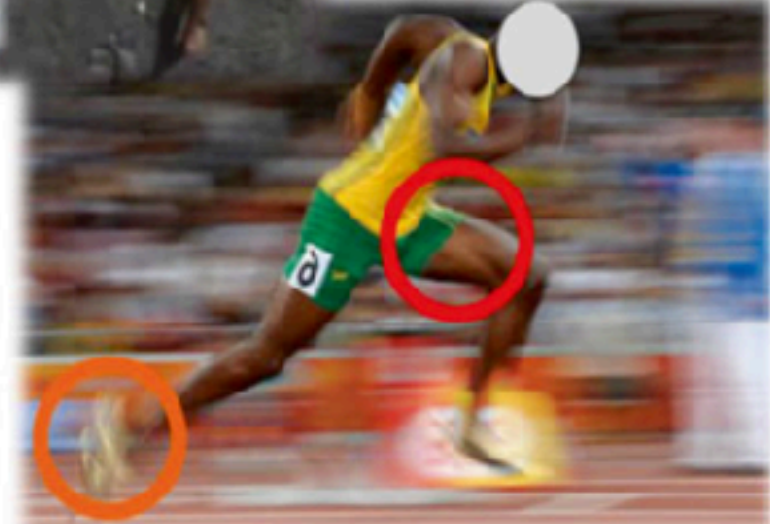
OG Olympic Games



Fig. 1.1 Main injury location for female athletes during international athletics championships from 2007 to 2014 [18]



Fig. 1.2 Main injury location for male athletes during international athletics championships from 2007 to 2014 [18]



F-MARC - Football for Health
15 years of F-MARC
Research and Education
1994 - 2009

Country	Level of play	Injuries per 1000 game hours	Injuries per 1000 training hours
MALES			
Iceland	National elite, first league	24.6	2.1
Sweden	Sr. National team	30.3	6.5
Sweden	National top division	25.9	5.2
US	MLS professionals	35.5	2.9
UK	Premier League, 1st and 2nd division	25.9	3.4
Finland	Highest national league	25.9	3.4
Sweden	1st division	21.8	4.6
	2nd division	18.7	5.1
	3rd division	16.9	7.6
	6th division	14.6	7.5
Denmark	2nd division (high)	18.5	2.3
	Series (low)	11.9	5.6
FEMALES			
Sweden	Senior players, various skill levels	14.3	3.7
Sweden	Premier, 2nd division	24	7
YOUTH (<18y)			
New Zealand	Schoolboy	16.2	3.7
Switzerland	High level males	18.7	4.1
	Low level males	21.7	8.2
Denmark	Male youth	14.4	3.6

Tab. 2.1.1. Incidence of football injuries in different studies

	Adult players				Youth 16-18y		Youth 14-16y	
	Top	3rd league	Amateur	Local	High level	Low level	High level	Low level
Training hours	307.4	337.1	184.3	133.8	267.7	148.5	249.9	135.6
Game hours	51.3	60.2	46.3	54.7	55.4	40.6	51.4	32.2
Training /game ratio	6.0	5.6	4.0	2.4	4.8	3.7	4.9	4.2
Injury per player								
TOTAL	2.0	1.8	2.1	3.8	2.2	2.6	1.8	1.9
Mild	.86	.71	.94	2.25	1.23	1.59	1.03	.87
Moderate	.95	.68	.59	1.23	.78	.55	.53	.59
Severe	.19	.45	.53	.44	.22	.45	.24	.48

Tab. 2.3.1.1 Exposure time and average number of injuries per player in different age and skill-level groups

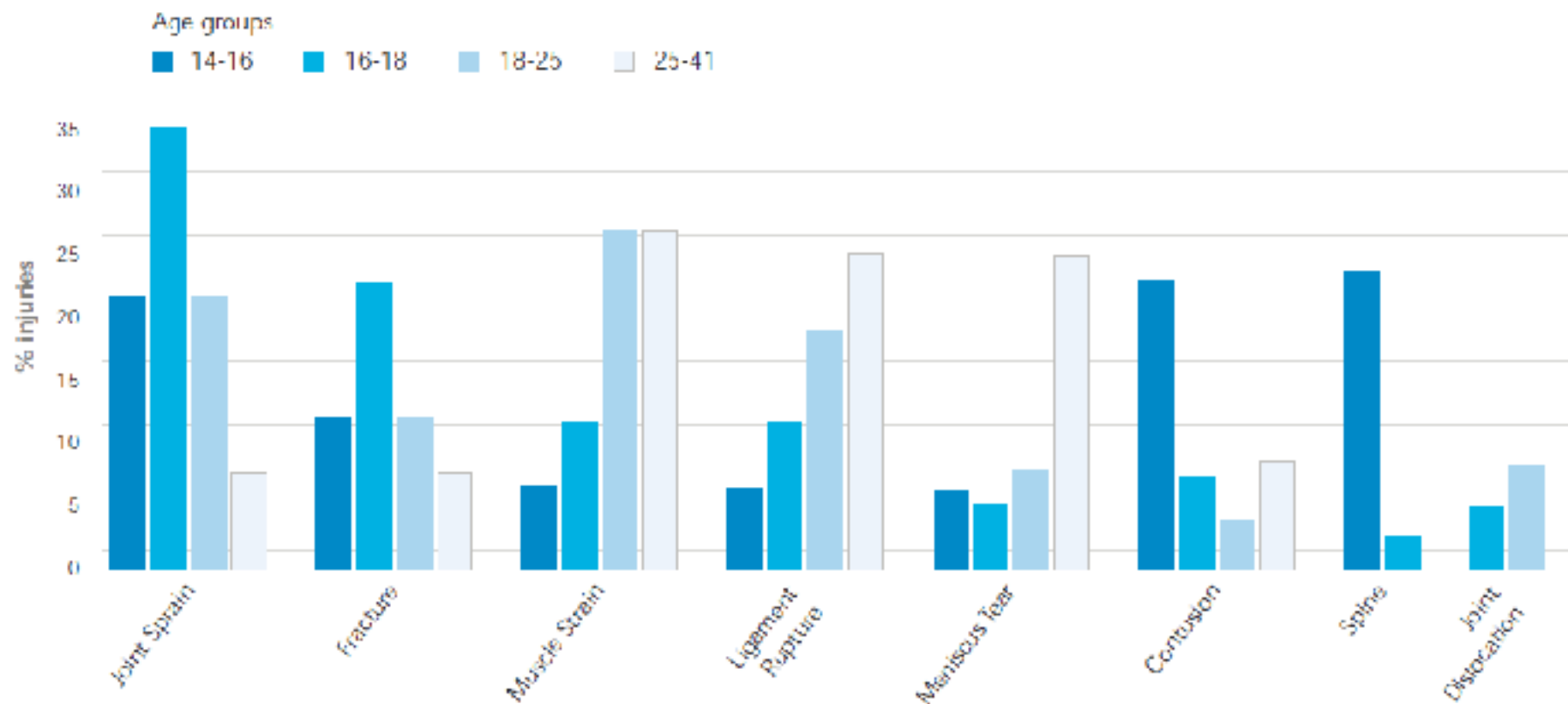


Fig. 2.3.2.1 Type of injury in different age groups

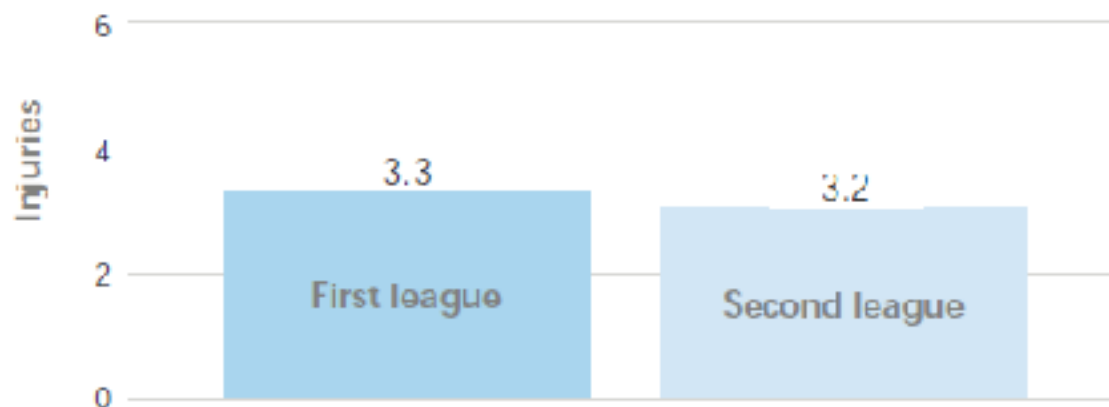


Fig. 2.3.3.1 Incidence of overuse injuries and injuries during training

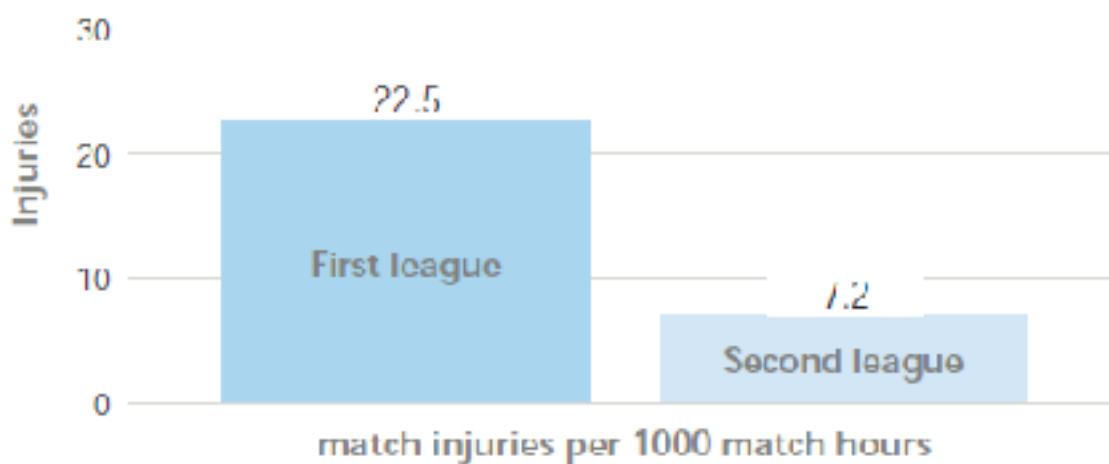


Fig. 2.3.3.2 Incidence of match injuries

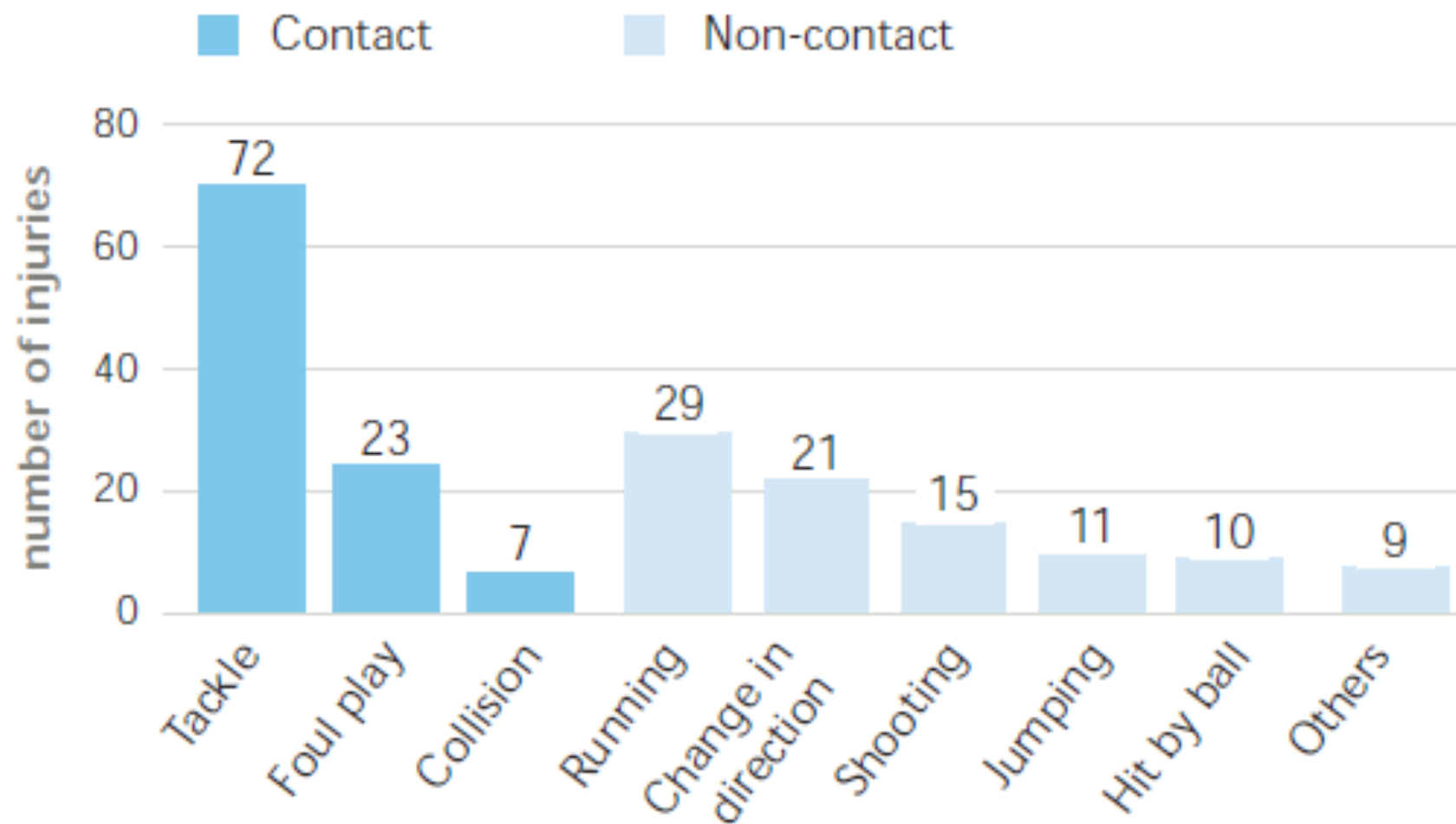


Fig. 2.3.4.1 Mechanisms of injury

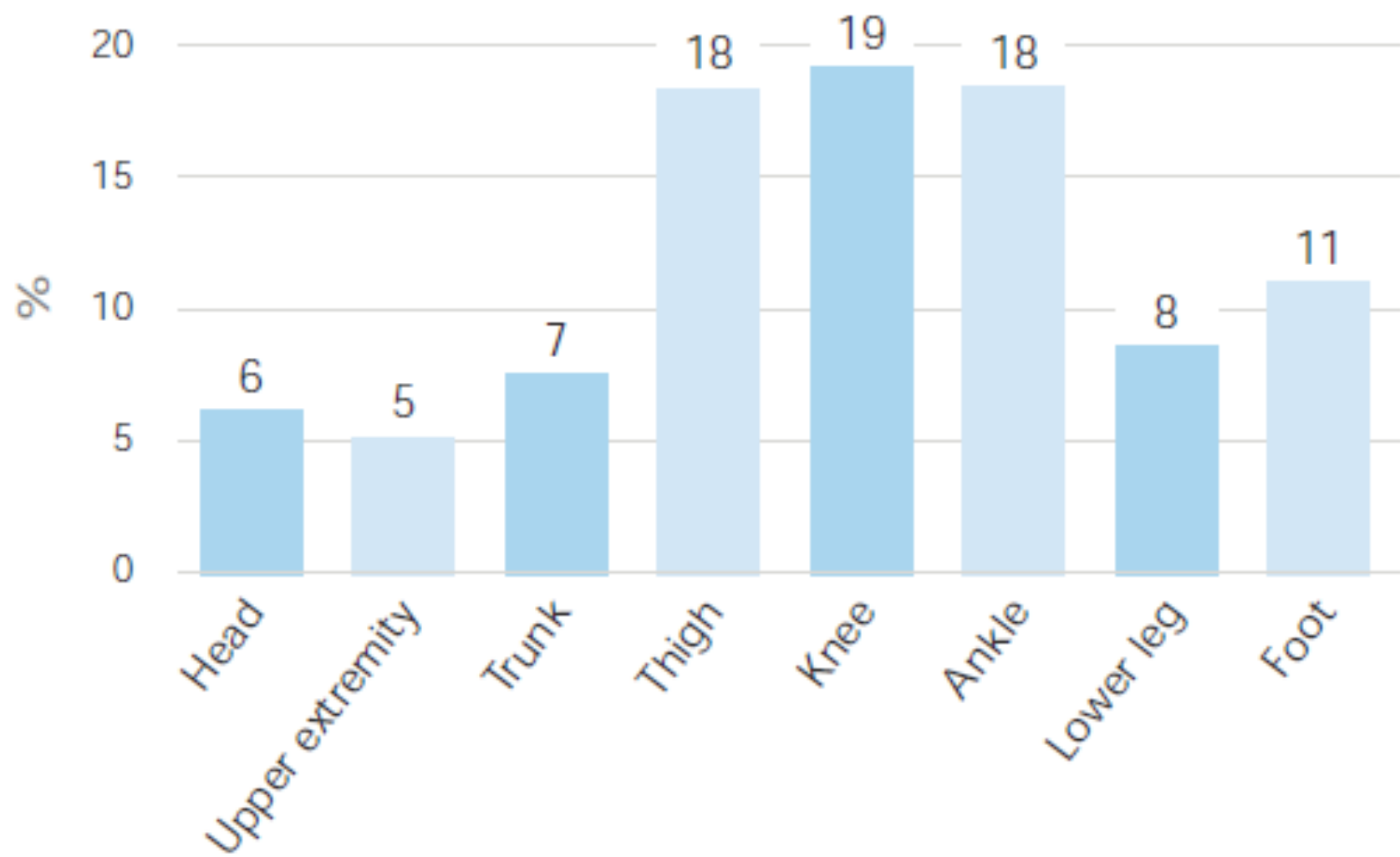


Fig. 2.3.4.2 Location of injury

2.4.1 Injuries during FIFA Competitions 1998 - 2001

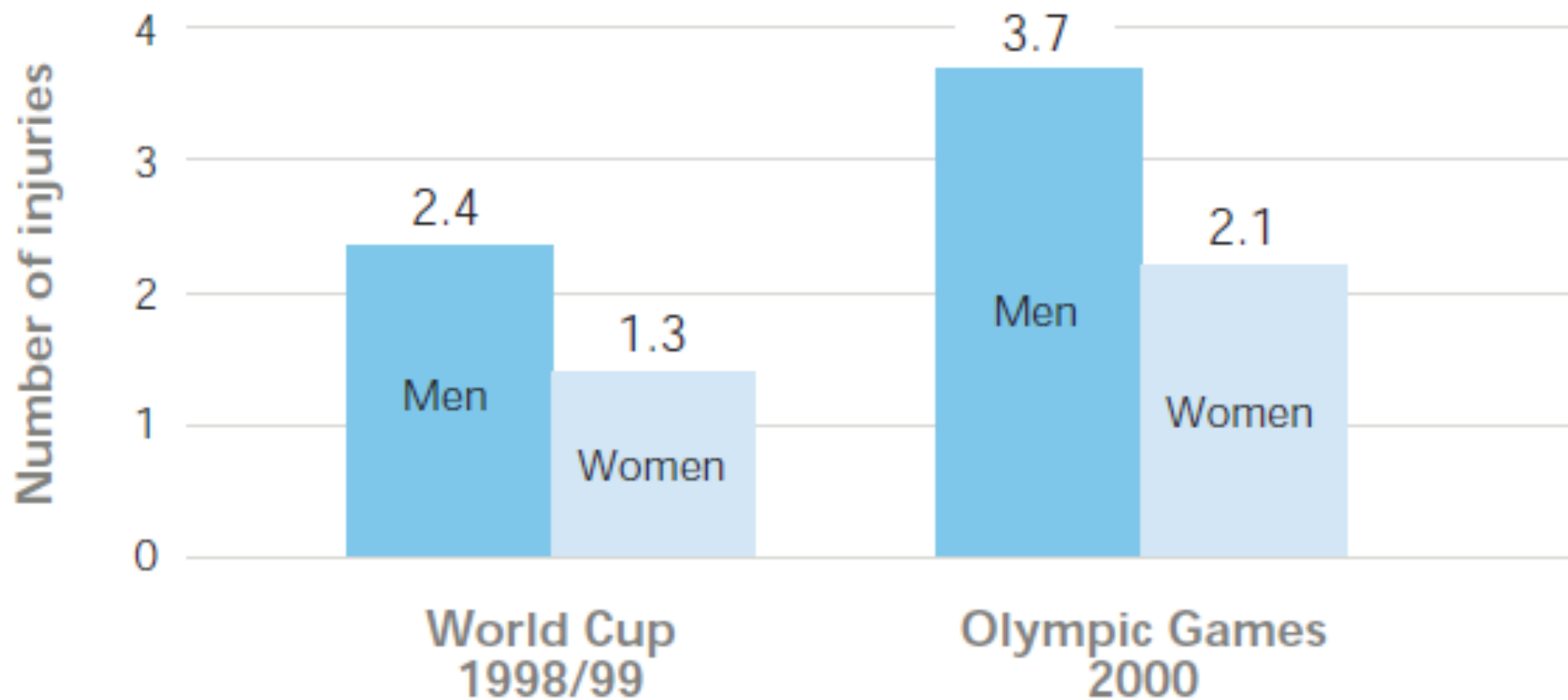


Fig. 2.4.1.1 Injuries per match in male and female players FIFA World Cups 1998/99

2.4.2 Injuries during the 2002 FIFA World Cup Korea/Japan™

	Numbers of injuries	Number of injuries with time lost	No contact	Contact no foul	Contact foul
Concussion	4	1	0	2	2
Upper extremity	8	3	0	5	2
Trunk	2	2	1	1	0
Hip	6	6	3	2	1
Groin	9	8	8	1	0
Thigh	30	26	11	4	8
Knee	22	15	4	11	6
Lower leg	29	15	5	6	16
Ankle	25	19	3	8	12
Foot	14	8	4	3	5

Tab. 2.4.2.1 Number and circumstances of injury

	Noncontact injuries (n=45)*	Contact injuries (n=122)*
Estimate of absence	n (%)	n (%)
No absence	5 (11.9)	47 (40.5)
1-3 days	15 (35.7)	43 (37.1)
4-7 days	12 (28.6)	15 (12.9)
7-28 days	8 (19.0)	10 (8.6)
>28 days	2 (4.8)	1 (0.9)

* The estimated duration of absence is missing for 3 noncontact and 6 contact injuries.

Tab. 2.4.2.2 Estimated duration of absence in non-contact and contact injuries

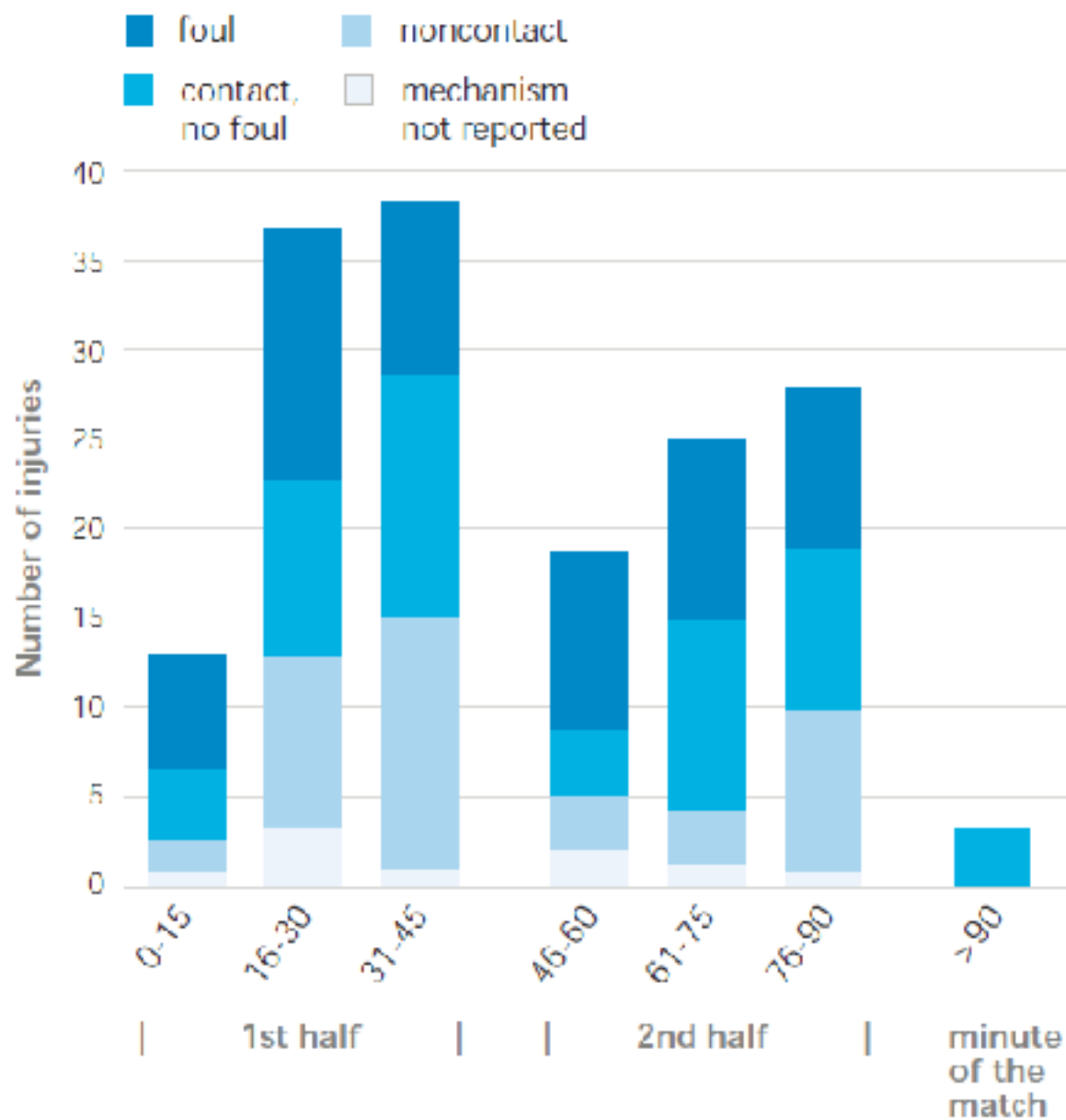


Fig. 2.4.2.2 Number of injuries in relation to time in the match regarding mechanism of injury

Table 1 Number of matches, response rate, severity and incidence of injury in FIFA World Cups

Tournament	France 1998	Korea/Japan 2002	Germany 2006	South Africa 2010	Brazil 2014
Matches (n)	64	64	64	64	64
Response rate	124/128 (97%)	128/128 (100%)	128/128 (100%)	124/128 (97%)	124/128 (97%)
Match hours documented	2046	2112	2112	2046	2046
Injuries (n)	149	171	145	125	104
Injuries per 1000 player hours (95% CI)	72.8 (61.1 to 84.5)	81.0 (68.9 to 93.1)	68.7 (57.5 to 79.9)	61.1 (50.4 to 71.8)	50.8 (41.0 to 60.6)
Injuries per match (95% CI)	2.40 (2.01 to 2.79)	2.67 (2.27 to 3.07)	2.27 (1.90 to 2.64)	2.02 (1.67 to 2.37)	1.68 (1.36 to 2.00)
Estimated duration of absence from sport (days)					
0		53 (33%)	39 (30%)	39 (35%)	41 (43%)
1–3		59 (37%)	43 (33%)	59 (49%)	15 (16%)
4–7		27 (17%)	19 (15%)	9 (7%)	15 (16%)
8–28		18 (11%)	23 (18)	3 (3%)	16 (17%)
29 and more		3 (2%)	7 (5%)	2 (2%)	8 (8%)
Not specified		0	5	9	6
Missing		11	9	4	3
Injuries with subsequent absence		107	97	82	60
Injuries per 1000 h (95% CI)		50.7 (41.1 to 60.3)	45.9 (36.8 to 55.0)	40.1 (31.4 to 48.8)	29.3 (21.9 to 36.7)
Injuries per match (95% CI)		1.67 (1.35 to 1.99)	1.51 (1.20 to 1.80)	1.29 (1.01 to 1.57)	0.97 (0.72 to 1.22)

Table 2 Location, type and mechanism of injury in FIFA World Cups

Tournament	France 1998	Korea/Japan 2002	Germany 2006	South Africa 2010	Brazil 2014
Injured body part					
Head, face, neck	16 (15%)	25 (15%)	13 (9%)	13 (10%)	19 (18%)
Upper extremity, including shoulder	9 (9%)	8 (5%)	12 (8%)	12 (10%)	10 (10%)
Trunk	9 (9%)	6 (4%)	15 (10%)	8 (6%)	7 (7%)
Hip/groin	2 (2%)	11 (6%)	7 (5%)	6 (5%)	4 (4%)
Thigh	21 (20%)	30 (18%)	21 (14%)	36 (29%)	26 (25%)
Knee	24 (23%)	22 (13%)	17 (12%)	9 (7%)	12 (12%)
Lower leg	6 (6%)	29 (17%)	30 (21%)	19 (15%)	13 (12%)
Ankle	13 (13%)	25 (15%)	24 (17%)	15 (12%)	10 (10%)
Foot	5 (5%)	14 (8%)	6 (4%)	7 (6%)	2 (2%)
Total	105	170	145*	125	104
Missing/unclear	44	1	0	0	0
Type of injury					
Concussion	1 (1%)	4 (2%)	1 (1%)	1 (1%)	5 (5%)
Fracture	3 (4%)	3 (2%)	1 (1%)	4 (3%)	6 (6%)
Tendon or ligament rupture/meniscus lesion	2 (2%)	1 (1%)	5 (3%)	1 (1%)	4 (4%)
Sprain (dislocation)	10 (12%)	24 (14%)	24 (15%)	15 (12%)	8 (8%)
Strain/muscle fibre rupture	19 (23%)	35 (21%)	20 (14%)	21 (17%)	25 (24%)
Contusion	34 (41%)	84 (50%)	74 (51%)	53 (43%)	39 (38%)
Laceration/abrasion/blister	6 (7%)	12 (7%)	6 (4%)	9 (7%)	10 (10%)
Others	8 (10%)	6 (2%)	14 (10%)	20 (16%)	6 (6%)
Total	83	169	145	124	103
Missing	66	2	0	1	1
Mechanism of injury					
Non-contact injuries		45/167 (27%)	38/142 (27%)	42/121 (35%)+	36/101 (36%)
Contact injuries		122/167 (73%)	104/142 (73%)	79/121 (65%)+	65/101 (64%)
Contact injury caused by foul		59/115 (51%)	57/93 (61%)	19/79 (24%)+	22/63 (35%)
Foul sanctioned by the referee		28/54 (52%)	32/56 (57%)	—	12/21 (57%)

*One injury affected two body parts.

+Mechanism of injury was assessed with a different question.⁶

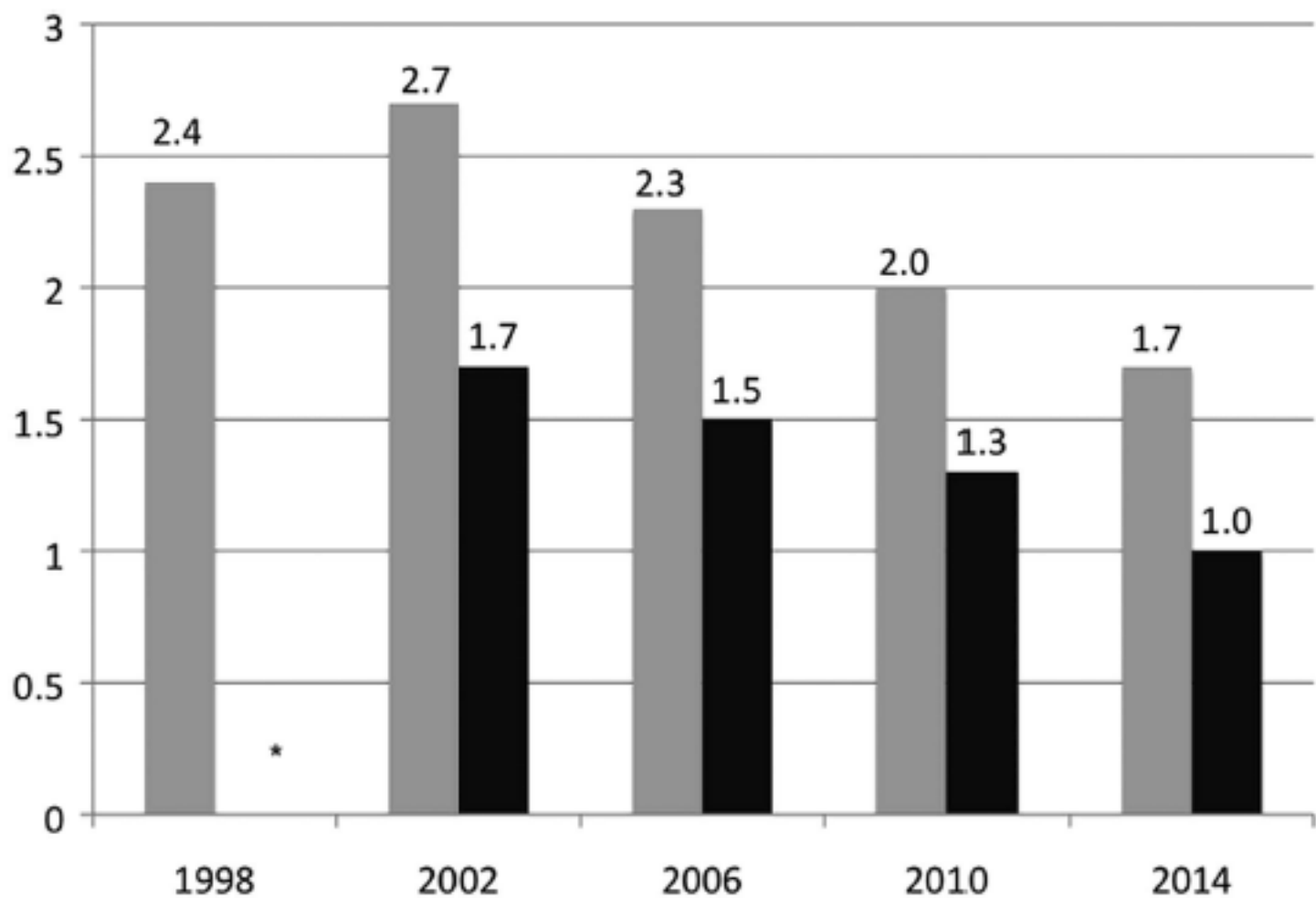


Figure 1 Number of injuries per match in FIFA World Cups 1998–2014 (all injuries (grey bars); injuries expected to result in time loss (black bars)); *information with regard to time loss was not documented during the 1998 FIFA World Cup.

YARALANMANIN CİDDİYETİ

- Spor yaralanmaları olayını anlayabilmek için yalnız spor yaralanmasının tipi ve insidansının iyi bir tanımına değil, fakat aynı zamanda verimli ve pratik olarak yaralanmaların derecelendirilmesine de ihtiyaç duyulur.
- Spor yaralanmaları ciddiye derecesine göre üç şekilde görülmektedir.
- HAFİF
 - 1. derece: 1-7 gün kadar etkinliklere katılamama
- ORTA
 - 2. derece : 7-21 gün kadar etkinliklere katılamama
- CİDDİ
 - 3. derece : 21 günden daha uzun etkinliklere katılamama ya da kalıcı yaralanma durumudur

Spor yaralanmalarının Ciddiyeti

- Burada altı önemli faktör vardır.
 - 1- Spor yaralanmasının tabiatı,
 - 2- Tedavinin şekli ve süresi,
 - 3- Spordan uzak kalınan süre,
 - 4- Kaybedilen işgünü,
 - 5- Kalıcı hasar ve
 - 6- Maliyet.

Yaralanmalarının Maliyeti:

- 1- Direkt maliyetler: Örneğin tıbbi tedavinin maliyeti (teşhis, muayene ücretleri, röntgen giderleri, ilaç giderleri gibi) ve,
 - Bir futbol yaralanmasının tıbbi tedavi harcamasının yaklaşık 150 dolar olduğunu belirtmiştir.
- 2- Dolaylı maliyetler: Üreticilikten, hastalık ve ölümlere bağlı olarak artan kayıplar yoluyla (işgünü kaybı, yaralanma veya ölüme bağlı nedenler).

Sosyal maliyet

- Bir başka maliyet hesabı şekli de hesaplanabilen ve hesaplanamayan sosyal maliyetlerdir.
- Hesaplanabilen maliyetler sigorta ve kanuni giderleri içerir.
- Hesaplanamayan maliyetler işe kişinin veya ailesinin psiko-sosyal yaşamı üzerine spor yaralanmalarının zararlı etkileri.
 - Ekonomik bağımlılığa düşmek,
 - sosyal statü kaybı,
 - sosyal pozisyon kaybı veya izolasyon.
- Bu maliyetler ancak bir dereceye kadar yaşamın kalitesi hesaplanabiliyorsa hesaplanabilir niteliğe sahiptir.