Journal of Athletic Training 2012:47(2):191–197

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Injuries in Portuguese Youth Soccer Players During Training and Match Play

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Context: Epidemiologic information on the incidence of youth soccer injuries in southern Europe is limited.

Objective: To compare the incidence, type, location, and severity of injuries sustained by male subelite youth soccer players over the 2008–2009 season.

Design: Descriptive epidemiology study.

Setting: Twenty-eight Portuguese male youth soccer teams.

Patients or Other Participants: A total of 674 youth male subelite soccer players in 4 age groups: 179 U-13 (age range, 11–12 years), 169 U-15 (age range, 13–14 years), 165 U-17 (age range, 15–16 years), and 161 U-19 (age range, 17–18 years).

Main Outcome Measure(s): Injuries that led to participation time missed from training and match play prospectively reported by medical or coaching staff of the clubs.

Results: In total, 199 injuries reported in 191 players accounted for 14.6 ± 13.0 days of absence from practice. The incidence was 1.2 injuries per 1000 hours of exposure to soccer (95% confidence interval [CI] = 0.8, 1.6), with a 4.2-fold higher incidence during match play (4.7 injuries per 1000 hours of exposure; 95% CI = 3.0, 6.5) than during training (0.9 injuries per 1000 hours of exposure; 95% CI = 0.6, 1.3) ($F_{1,673} = 17.592$, $P < .001$). The overall incidence of injury did not increase with age ($F_{1,673} = 1.299$, $P = .30$), and the incidence of injury during matches ($F_{1,673} = 2.037$, $P = .14$) and training ($F_{1,673} = 0.927$, $P = .44$) did not differ among age groups. Collisions accounted for 57% (n = 113) of all injuries, but participation time missed due to traumatic injury did not differ among age groups ($F_{3,110} = 1.044$, $P = .38$). Most injuries (86%, n = 172) involved the lower extremity. The thigh was the most affected region (30%, n = 60) in all age groups. Muscle strains were the most common injuries among the U-19 (34%, n = 26), U-17 (30%, n = 17), and U-15 (34%, n = 14) age groups, whereas contusions and tendon injuries were the most common injuries in U-13 players (both 32%, n = 8). The relative risk of injury slightly increased with the age of the competitors.

Conclusions: The higher incidence of injury during matches than training highlights the need for education and prevention programs in youth soccer. These programs should focus on coach education aimed at improving skills, techniques, and fair play during competitions with the goal of reducing injuries.

Key Words: association football, epidemiology, injury incidence, time missed, adolescents

Key Points

- The overall incidence of injury and incidence of training and match injuries in subelite youth male soccer players did not increase with age or differ among age groups.
- The incidence of injury was higher during competition than training except among U-13 players.
- The incidence of injury in these subelite youth players was not higher than that in athletes participating in other youth sports.
- The low incidence of injury highlights soccer as a safe activity that can be practiced with few harmful consequences.

Soccer is the most popular sport worldwide. Participation rates in Portugal are high, with 547000 registered players, of whom approximately 108000 are children and adolescents.[1] Despite its attractiveness at the youth level, empirical information on the incidence of injuries in southern Europe is limited.[2]

Regular participation and training in soccer have benefits related to physical and mental health, including a broad spectrum of effects on fitness per se and on cardiovascular and musculoskeletal variables.[3,4] Nevertheless, soccer is a contact or collision sport with injury risk. Given the high participation rates, the prevalence of soccer-related injuries is increasing among the youth population,[2,4,5] which imposes an economic burden on health care systems worldwide.[6] Thus, efforts are needed to prevent and control injuries, especially injuries that might preclude participation in the game and other wholesome physical activities into adulthood, to guarantee the health and safety of young soccer players.[6,7]

Youth participation in soccer varies from recreational play to international competitions. Similarly, skill levels and objectives of participation among youth are diverse, so injury patterns might vary by geographic region and with styles of play.

Overall, most injuries in youth soccer are acute, usually affecting the ankle and knee joints and muscles of the thigh and calf. The most common injuries are sprains, strains, and contusions.[6,8]

The variability in number and characteristics of soccer-related injuries reported in the literature might reflect limited data and methodologic discrepancies related to the definition of *injury,* study design, and player characteristics.[8,9] To our knowledge, injuries among youth soccer players in different age groups have not been compared prospectively for a complete season with the same study design. Therefore, the purpose of our study was to compare the incidence, type, location, and severity of injuries sustained by male subelite youth soccer players over a single season.

METHODS

Participants and Study Period

Before the start of the season, 48 youth amateur soccer teams for males from the northwest region of Portugal agreed to participate in the study. However, over the course of the season, 13 teams did not report any information, physiotherapists for 5 teams dropped out for professional reasons, and 2 teams dismissed the coaches in midseason and discontinued reporting. Thus, 20 teams withdrew without providing data for the study. From an initial sample of 1102 players, 674 players (61.2%) from 12 to 19 years of age participating in 4 age groups (179 U-13 [age range, 11–12 years], 169 U-15 [age range, 13–14 years], 165 U-17 [age range, 15–16 years], 161 U-19 [age range, 17–18 years]) were followed prospectively from the preseason (August 2008) until the last training session of the competitive season (June 2009). Throughout the season of approximately 43 weeks (300 ± 31 days), each team played 22 to 38 official matches and trained 3 or 4 times per week.

Each club provided written consent after the parents and players provided written informed consent, and the Research Ethics Committee of the Faculty of Sport, University of Porto, approved the study.

Definition of Injury

Definitions, methods, and implementation procedures were established in accordance with the consensus statement for soccer.[9] Participation time missed due to injury was recorded prospectively on a standardized injury report form by a member of the team medical or coaching staff (physiotherapists for 26 teams, coaches for 2 teams). The medical or coaching staffs were contacted weekly by telephone or e-mail and questioned about all injuries that had occurred in their respective teams during the previous week. One member of the research team (J.B.) visited the clubs and collected the injury reports at least once each month. When necessary, the physiotherapists, coaches, or players were contacted again by telephone to clarify specific aspects of injuries. The same researcher later registered the information on a specific injury database that was established at the University of Porto for scientific purposes only.

An *injury* was registered if the player could not participate fully in training or match sessions the day after the injury.[9] A player was considered injured until the team's medical staff (or occasionally the team coach) permitted complete involvement in training and availability for match selection. A *traumatic injury* was defined as an injury resulting from an identifiable event (ie, an injury with sudden onset caused by contact or collision with another player, the ball, or another object). An *overuse injury* was defined as an injury with gradual onset (associated with repetitive microtrauma) and without an identifiable responsible event. A *recurrent injury* was defined as an injury of the same type and at the same site as an index injury that occurred after a player's return to full participation after the initial injury. Illnesses or injuries that were not related to soccer were not included. Injury severity was classified according to participation time missed[9]: minimal (range, 1–3 days), mild (range, 4–7 days), moderate (range, 8–28 days), and severe (>28 days).

Exposure and Incidence of Injury

Data on match and training exposure were collected on a team basis.[9] All medical staffs and coaches were contacted each week by e-mail to provide information on numbers of participants and duration of training sessions and matches. The durations of regular league matches in Portugal were as follows: two 30-minute halves for U-13, two 35-minute halves for U-15, two 40-minute halves for U-17, and two 45-minute halves for U-19. Training sessions usually lasted 90 minutes for all age groups. Incidence of injury was calculated as the total number of injuries per 1000 hours of play during training and during match play and for total exposure.

Statistical Analyses

We present descriptive and comparative data, including means, standard deviations, and 95% confidence intervals (CIs). Proportions were analyzed using the χ^2 test where appropriate. For data with small frequencies, a simple qualitative descriptive analysis was used. Participation time missed due to injury and incidence were analyzed using factorial analysis of variance. Where possible, a post hoc Bonferroni multiple-comparisons test was conducted on the ranks to isolate differences among age groups. All tests were 2-tailed, and the α level was set at .05. We used SPSS (version 19; SPSS Inc, Chicago, IL) for all analyses.

RESULTS

Exposure

We found 161850 hours of exposure for all teams, 149803 hours of training exposure, and 12047 hours of match play. Total exposure increased with age group but was different only between U-19 and U-13 players ($F_{1,673} = 3.115$, $P = .045$). Average training exposure also increased with age group but was not different among groups ($F_{1,673} = 2.703$, $P = .07$). As might be expected, duration of match exposure differed by age category, and differences occurred between the U-19 and the U-15 and U-13 groups ($F_{1,673} = 11.021$, $P < .001$) (Table 1). However, the number of matches throughout the season was similar among age groups (U-13 = 33.0 ± 4.6, U-15 = 28.9 ± 4.7, U-17 = 30.9 ± 5.5, and U-19 = 32.4 ± 3.7 matches; $F_{1,673} = 1.096$, $P = .37$).

Incidence of Injury and Risk Ratio

Overall, 199 injuries (139 during training, 60 during matches) in 191 players (29%) were recorded throughout the

Table 1. Total Exposure, Training, and Match Exposure, h (Mean ± SD), Through a Season for 674 Portuguese Youth Soccer Players by Competitive Age Group

	Age Group			
Exposure	U-13 (n = 179)	U-15 (n = 169)	U-17 (n = 165)	U-19 (n = 161)
Total, h	4674 ± 1315[a]	5647 ± 1590	6119 ± 1311	6682 ± 724
Training, h	4311 ± 1291	5277 ± 1552	5666 ± 1282	6147 ± 754
Match, h	363 ± 50[a]	370 ± 61[a]	453 ± 81	535 ± 62

[a] Indicates different from U-19 ($P < .05$).

season. The relative risk of injury was higher in U-19 players than in other age groups (U-17 = 1.4 [95% CI = 1.1, 1.8; $P = .02$], U-15 = 1.9 [95% CI = 1.4, 2.7; $P < .001$], and U-13 = 3.4 [95% CI = 2.3, 5.0; $P < .001$]). The overall incidence of injury did not increase with age ($F_{1,673} = 1.299$, $P = .30$).

The overall incidence was 1.2 injuries per 1000 playing hours (95% CI = 0.8, 1.6) but was lower during training (0.9 injuries per 1000 hours of exposure; 95% CI = 0.6, 1.3) than during matches (4.7 injuries per 1000 hours of exposure; 95% CI = 3.0, 6.5) ($F_{1,673} = 17.592$, $P < .001$). The incidence of injury was higher during matches than during training in U-19 (5.9 fold; $P = .01$), U-17 (3.4 fold; $P = .03$), and U-15 (8.7 fold; $P = .007$) but not in U-13 ($P = .11$). We did not find differences in the incidence of injury during matches ($F_{1,673} = 2.037$, $P = .14$) and training ($F_{1,673} = 0.927$, $P = .44$) among age groups (Table 2).

Participation Time Missed and Distribution Throughout the Season

The 199 injuries accounted for a loss of 2896 days (ie, absence from training and match play over the season). Each injury accounted for 14.6 days (95% CI = 12.7, 16.4) absent from training and competition during the season. Participation time missed due to injury was higher in U-19 (18.0 days) than U-13 (9.8 days) players ($F_{3,195} = 3.359$, $P = .04$). Participation time missed due to match injuries did not differ among age groups ($F_{3,53} = 0.674$, $P = .57$), but training injuries were associated with more time missed among U-19 (19.8 days) than among U-17 (11.7 days) ($F_{3,138} = 3.939$, $P = .02$) and U-13 (10.2 days) ($F_{3,138} = 3.939$, $P = .04$) players (Table 3). The incidence of severe injuries was 3 times higher in the U-19 than the U-13 ($F_{1,673} = 3.498$, $P = .04$) players, whereas the incidence of minimal (slight), mild, or moderate injuries did not differ among age groups ($F_{1,673}$ range, 0.215–1.169; $P > .05$) (Table 2).

The overall incidences of injuries and injuries sustained in training or competition per month across all age groups throughout the season are shown in the Figure. Incidence of injury did not differ between training and matches or among age groups over the season ($F_{1,673}$ range, 1.400–6.913, $P > .05$). The overall incidence was higher in September than in May ($F_{1,673} = 26.078$, $P = .03$) and June ($F_{1,673} = 26.078$, $P = .002$) and was higher in October than in May ($F_{1,673} = 26.078$, $P = .03$) and June ($F_{1,673} = 26.078$, $P = .004$), whereas the incidence of injuries during training was higher in September than in May ($F_{1,673} = 25.870$, $P = .006$) and June ($F_{1,673} = 25.870$, $P = .04$). We observed a peak that was not different in the incidence of match injuries (15.3 injuries per 1000 hours of exposure) in October ($F_{1,673} = 19.691$, $P = .10$). In addition, knee sprains and thigh strains had the highest incidence in September (0.3 injuries per 1000 hours of exposure), whereas tendon injuries were most common in October (0.8 injuries per 1000 hours of exposure). The proportion of injuries sustained during training was higher than that during match play in August ($\chi^2 = 10.667$, $P = .001$), September ($\chi^2 = 7.759$, $P = .005$), and November ($\chi^2 = 10.714$, $P = .001$).

Injury Type, Location, and Circumstance

Most injuries (86%, n = 172) involved the lower limb. Although the proportion of injuries by type ($\chi^2 = 12.761$, $P = .005$)

Table 2. Incidence of Injury per 1000 Hours for Portuguese Youth Soccer Players by Competitive Age Group (Mean [95% Confidence Interval])

	Age Group			
Injury	U-13	U-15	U-17	U-19
Occurrence				
Match play	2.0 (1.3, 5.4)	6.1 (2.8, 9.4)[a]	3.7 (0.4, 7.0)[a]	7.1 (3.7, 10.4)[a]
Training	0.5 (0.2, 1.2)	0.7 (0.5, 1.4)	1.1 (0.4, 1.8)	1.2 (0.5, 1.9)
Severity				
Minimal	0.2 (0.1, 0.4)	0.3 (0.1, 0.7)	0.2 (0.1, 0.4)	0.2 (0.1, 0.5)
Mild	0.3 (0.2, 0.7)	0.1 (0.1, 0.4)	0.3 (0.1, 0.8)	0.2 (0.0, 0.5)
Moderate	0.4 (0.2, 0.5)	0.6 (0.4, 0.7)	0.7 (0.1, 1.4)	1.0 (0.2, 1.8)
Severe	0.0 (0.0, 0.1)	0.1 (0.0, 0.2)	0.1 (0.0, 0.2)	0.3 (0.0, 0.5)[b]
Cause				
Trauma	0.4 (0.0, 0.9)	0.6 (0.0, 1.2)	1.0 (0.1, 2.1)	1.1 (0.0, 2.1)
Overuse	0.3 (0.3, 0.9)	0.6 (0.1, 1.3)	0.7 (0.6, 2.1)	0.8 (0.0, 2.1)
Total	0.6 (0.2, 1.5)	1.1 (0.3, 2.0)	1.4 (0.5, 2.2)	1.7 (0.9, 2.5)

[a] Indicates different from training ($P < .05$).
[b] Indicates different from U-13 ($P < .05$).

Table 3. Days of Participation Time Missed Associated With Injury by Occurrence and Cause Among Portuguese Youth Soccer Players by Competitive Age Group (Mean [95% Confidence Interval])

	Age Group			
Injury	U-13	U-15	U-17	U-19
Occurrence				
Match play	8.6 (0.7, 16.5)	12.4 (5.5, 19.3)	16.2 (7.4, 25.1)	14.0 (10.7, 17.4)
Training	10.2 (6.3, 14.0)	14.4 (9.4, 19.3)	11.7 (8.7, 14.8)	19.8 (14.9, 24.6)[a,b]
Cause				
Trauma	7.9 (4.4, 11.3)	11.3 (5.3, 17.3)	13.2 (8.7, 17.7)	13.0 (10.3, 15.8)[c]
Overuse	12.8 (6.2, 19.4)	16.1 (11.0, 21.1)	12.1 (8.2, 16.1)	25.1 (18.0, 32.1)[b]
Total	9.8 (6.6, 13.1)	13.6 (9.8, 17.5)	12.8 (9.8, 15.8)	18.0 (14.5, 21.4)[a]

[a] Indicates different from U-13 ($P<.05$).
[b] Indicates different from U-17 ($P<.05$).
[c] Indicates different from overuse ($P<.001$).

and location ($\chi^2=7.955$, $P=.047$) differed among age groups, the incidence of injuries by lower limb location did not differ among age groups ($F_{1,673}$ range, 0.628–1.838; $P>.05$). The thigh was injured most frequently, followed by the ankle, foot or toe, and knee, respectively (Table 4). Four head or face injuries (2%), including 1 concussion, were reported. Thigh injuries accounted for more days of absence among U-19 (24.0 days [range, 16.3–31.7 days]) than U-17 (11.6 days [range, 6.2–17.0 days]) players ($F_{3,56}=3.818$, $P=.045$), but we did not find differences for other age groups and body locations ($F_{1,673}$ range, 0.422–1.338; $P>.05$). A higher proportion of muscle strains was observed among U-19, U-17, and U-15 players, whereas contusions and tendon injuries were the most common injuries in U-13 players (Table 4). Ligament sprains were observed most often among U-19 players ($\chi^2=22.8$, $P=.001$). Eight recurrent injuries were observed, representing 4% of the total. These included 3 thigh strains, 2 ankle sprains, 1 knee sprain, 1 meniscus tear, and 1 toe contusion.

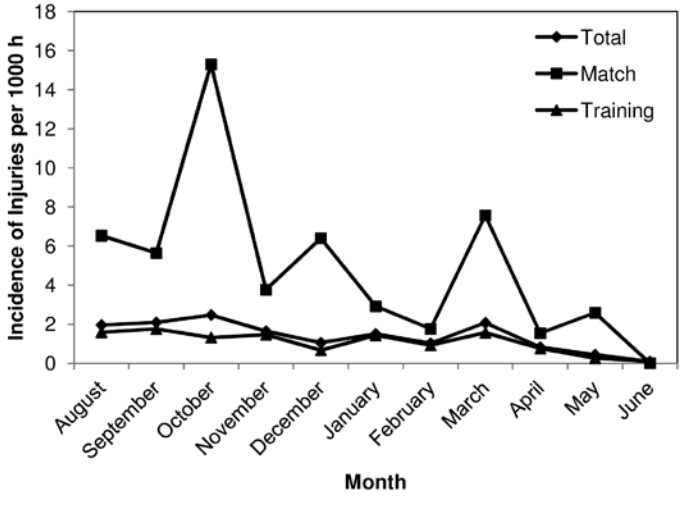

Figure. Total incidence of injury and the incidence of injury in training and match play for Portuguese youth soccer players throughout the season. Values are expressed as incidence of injuries per 1000 hours of soccer exposure for all age groups (U-13, U-15, U-17, U-19).

Overuse injuries accounted for 43% (n=86) of all injuries, whereas the remaining 57% (n=113) were due to external trauma ($\chi^2=4.226$, $P=.04$). The incidence of overuse and acute injuries did not differ among age groups ($F_{1,673}=0.526$, $P=.48$) (Table 2) or between training and match play ($F_{1,673}=0.475$, $P=.67$). However, missed participation time was greater due to overuse (25.1 days) than acute (13.0 days) injury among U-19 players ($F_{1,74}=13.365$, $P<.001$). Time missed due to acute injury did not differ among age groups ($F_{3,110}=1.044$, $P=.38$), but overuse injuries were associated with more time missed among U-19 (25.1 days) than U-17 (12.1 days) players ($F_{3,81}=4.555$, $P=.007$) (Table 3). Most contact injuries (71%, n=141) involved collisions with other players ($\chi^2=99.235$, $P<.001$).

DISCUSSION

Incidence of Injury and Severity

The overall incidence of injury and incidence of training and match injuries in subelite youth male soccer players did not increase with age per se or among the age groups considered. The incidence was higher during competition than during training except among U-13 players, which is consistent with findings in other studies.[2,5,10] Although training exposure did not differ among age groups, U-13 players, on average, had the least amount of exposure in training sessions. The U-13 players also had less match and overall exposure than U-19 players. The reduced exposure might underlie the lack of difference in the incidence of injury in training and matches among U-13 players. In addition, match intensity and aggressiveness probably increases with age and might underlie the differences in the incidence of injury between training and matches observed among U-15, U-17, and U-19 players. Nevertheless, the highest incidence of severe injury was observed among U-19 players. Thus, development and implementation of preventive interventions, such as appropriate rule enforcement and emphasis on fair play, are recommended to reduce match-related injury rates and encourage the safe participation of children and adolescents in soccer.[4]

Subelite youth soccer players generally train and play less and at lower intensities than elite youth players. This might counteract poor technical skill as a factor in increased predisposition to injury.[4,11] Exposure could present a greater influence on injury risk than technical skills.

Table 4. Number (Percentage of Total by Age Group) of Injuries by Location and Type Among Portuguese Youth Soccer Players by Competitive Age Group

	Age Group				
Injury	U-13	U-15	U-17	U-19	Total
Location					
Head or face	0 (0)	1 (2)	1 (2)	2 (3)	4 (2)
Upper limbs	1 (4)	2 (5)	6 (11)	5 (6)	14 (7)
Trunk or spine	1 (4)	6 (15)	1 (2)	0 (0)	8 (5)
Hip or groin	2 (8)	4 (10)	5 (9)	3 (4)	14 (7)
Thigh	6 (25)	14 (34)	15 (26)	25 (33)	60 (30)
Knee	3 (13)	4 (10)	9 (16)	8 (11)	24 (12)
Lower leg	2 (8)	3 (7)	7 (12)	2 (3)	14 (7)
Ankle	5 (21)	5 (12)	3 (5)	22 (29)	35 (18)
Foot or toe	5 (18)	2 (5)	10 (18)	9 (11)	26 (13)
Type					
Fracture	1 (4)	0 (0)	3 (5)	1 (1)	5 (3)
Dislocation	0 (0)	0 (0)	3 (5)	3 (4)	6 (3)
Ligament sprain	4 (16)	7 (17)	13 (23)	26 (34)	50 (25)
Muscle rupture or strain	4 (16)	14 (34)	17 (30)	26 (34)	61 (31)
Tendon injury	8 (32)	3 (7)	5 (9)	5 (7)	21 (11)
Contusion	8 (32)	12 (29)	13 (23)	12 (16)	45 (23)
Other type	0 (0)	5 (12)	3 (5)	3 (4)	11 (6)
Total	25 (13)	41 (21)	57 (29)	76 (38)	199 (100)

Age, sex, and competitive level might be important discriminating variables in soccer injuries. Our results indicated that the incidence of injury in both training and competition was lower for subelite youth players than elite youth male[10,12] and female[13] players and adult soccer players.[14,15] However, given a lack of epidemiologic studies of youth soccer players in southern regions of Europe, comparisons between our results and those reported in studies of elite youth soccer players should be made with caution. Variations in the style of play among geographic areas might influence the risk of injury.[6] We also suggest that when conducting epidemiologic studies of sport injuries, researchers should consider additional risk factors, including player behaviors and skill level and coaching style.[16] To our knowledge, only 1 study exists in southern Europe in which the authors prospectively reported the incidence and patterns of injury among Greek youth soccer players.[2] The incidence in both training and matches was higher than that observed in our study. However, the definition of *injury* and the age of participants were slightly different in the 2 studies. Participants in the Greek study were 12 to 15 years of age, whereas participants in our study were 11 to 18 years of age.

Regular recreational soccer practice is indicated as an effective health-promoting activity,[3] but youth soccer still is considered to pose a higher risk of injury than other contact or collision sports, such as field hockey, rugby, basketball, and American football.[4] However, the results of our prospective study of subelite youth players did not indicate a higher incidence of injury than other youth sports.[16–18] By inference, the results suggested that soccer is a safe physical activity for the youth at the subelite level.

Other authors[10,19] have reported that most injuries in youth soccer players were minor and required no more than 1 week of absence from participation. In contrast, we noted a higher proportion of moderate injuries across all age groups. The difference might be related to the definition of *injury*; many minor injuries might have gone unreported because players did not completely stop practice. Although physiotherapists prospectively monitored injuries as they occurred, the incidence of minimal and mild injuries might have been underestimated. Moreover, most injuries in youth soccer do not need medical attention and can be addressed with basic first aid.[20] Therefore, subelite and recreational players might not believe they need to avoid regular sport participation due to minor injuries.

Other authors[7,21] also have observed variations in the incidence of injury over the course of a soccer season; injuries generally peak after the preseason training period and after a midseason break. Our observations of subelite youth players were consistent. The incidences of training and match injuries were highest in September and October, respectively, and corresponded with the preseason and start of the season. Consistent with observations in professional soccer,[21] the thigh and knee were the most common locations for injuries during the preseason. Muscle strains and ligament sprains were the most common types of injury, which suggests that at the beginning of the training regimen, players might not have reached appropriate levels of fitness, or the training program was inappropriate or too intense to allow adaptation.[7] In Portugal, subelite youth leagues finish their seasons by February or March, and this might explain the slight increase in injury rates observed from January to March. From April to June, most teams participate in short-term tournaments or friendly matches with no regular official competitive exposure. Both match and training intensity might be expected to decrease during this period, thereby contributing to the reduced incidence of injury during the last 3 months of the season.

Injury Type, Location, and Circumstance

Most reported injuries in our study affected the lower limb, which is consistent with reports in other studies of the incidence of injury.[2,7] As noted, the thigh was the most common site of injury in all age groups. Similar proportions of thigh

injuries have been observed in academy[7] and amateur[22] youth soccer players. However, in both studies the authors reported higher rates of knee injury than we found. Muscle ruptures or strains were the most prevalent types of injury and accounted for up to 30% (n = 60) of all injuries. The results did not differ from those of previously published studies of muscle strains in youth soccer players.[7,22]

Many researchers have indicated that youth soccer injuries affect mostly the knee and ankle.[2,4,10] The incidence of knee and anterior cruciate ligament injuries tends to be disproportionately higher in adolescent female than adolescent male soccer players.[6] Our results generally are consistent because no more than 12% (n = 24) of all injuries affected the knee, and only 1 anterior cruciate ligament injury was reported. Ligament sprains were observed primarily among the oldest age group and most often affected the ankle joint. Almost all ankle injuries (97%, n = 21) were due to trauma, and about two-thirds (63%, n = 14) involved a collision or tackle with an opponent, which was consistent with observations in soccer.[23] Higher levels of aggressiveness and higher numbers of tackles are expected among older players, and this might contribute to the higher proportion of ankle injuries in the U-19 age group.

A frequent report among youth soccer players is low back pain,[24] and hip and groin injuries or pain are very common in adult male players.[25,26] Given our definition of *injury* and methodologic procedures, we could not address back and groin or hip pain. Pain without any apparent injury, and thus without participation time missed, was not reported. However, large training and match loads and previous injury have been suggested as important contributing factors for hip and groin injuries.[26] Therefore, the low incidence of injuries we observed, supported by the low proportion of knee, ankle (except for the older age group), back, and hip and groin injuries, also suggests that the nature of the game might be different when played at the subelite level. Injuries differ between subelite and elite levels of competition among youth. In addition, the demands of return to practice and play for young players are not as intense as at the more elite and professional levels.[7]

In summary, soccer is a moderate- to high-intensity contact sport, with most injuries occurring from contact between players or between a player and the ground, ball, or goalpost rather than overuse.[2,4] Contact injuries accounted for up to 57% (n = 113) of all injuries. Most involved collisions with other players, with no differences in cause of injury among age groups. The severity of traumatic injuries was less than that observed for overuse injuries. Overall, the nature of amateur youth soccer, with less aggressiveness and perhaps with more respect for rules and fair play than at more elite and professional levels, also might contribute to the high levels of adherence and popularity of the sport.

CONCLUSIONS

Children and adolescents should regularly participate in all forms of physical activity, and soccer should not be an exception because it can contribute to physical fitness and physical activity strategies for the youth population.[4] Soccer practice attracts a large part of the population and can be advocated as a health-promoting activity.[3] However, like all sports, it is associated with the risk of injury. The low incidence of injury that we observed highlights soccer as a safe activity that can be practiced with few harmful consequences.

ACKNOWLEDGMENTS

We thank the participating clubs, medical staff, and coaches. João Brito acknowledges the Fundação para a Ciência e a Tecnologia for grant SFRH/BD/44702/2008.

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