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Injury incidence in elite youth soccer academy athletes: A 3-year retrospective follow up

Elit genç futbol akademisi sporcularında yaralanma insidansı: 3 yıllık geriye dönük takip

Serdar Arslan[1] Engin Dinç[2]

[1] Necmettin Erbakan University Faculty of Health Science, Department of Physiotherapy and Rehabilitation Konya, Turkiye

[2] Konya Provincial Directorate of Health Public Health Services Konya, Turkiye

ABSTRACT

Aim: The aim of this study was to investigate the incidence and characteristics of injuries suffered by elite soccer academy athletes**.**

Materials and Methods: A retrospective analysis was made of the health records between 2016 and 2019 of athletes in the elite male soccer academy of an elite football club. The cause, type, location, recurrence, and severity of the injuries, where the injuries occured and time lost due to the injuries were recorded. The injury incidence and prevalence were calculated.

Results: Overall, total injuries and seasonal incidence rate were 1.49 (1.33-1.68) and 8.06 (7.16-0.04) per 1000 hours, respectively. The injury burden ranged between 11.83 (10.53-13.29) days and 51.43 (49.11-53.85) days. The injury characteristics were not statistically different according to age groups (p>0.05).

Conclusion: Youth soccer players in the U19 and U21 age groups had more injuries than other junior age groups in a typical soccer season. It was concluded that there were more match injuries, the thigh was the most injured area, muscle injuries were more common, and the hamstring was the most frequently injured muscle.

Keywords: Athletic injuries, epidemiology, football, paediatric.

ÖZ

Amaç: *Bu çalışmanın amacı, elit futbol akademisi sporcularının maruz kaldığı yaralanmaların insidansını ve özelliklerini araştırmaktı.*

Gereç ve Yöntem: *Ulusal ve uluslararası düzeyde mücadele eden bir futbol kulübünün elit erkek futbol akademisindeki sporcuların 2016-2019 yılları arasındaki sağlık kayıtlarının geriye dönük analizi yapılmıştır. Yaralanmaların nedeni, türü, yeri, tekrarı ve ciddiyeti, yaralanmaların nerede meydana geldiği ve yaralanmalar nedeniyle kaybedilen zaman kaydedildi. Yaralanma insidansı ve prevalansı hesaplandı.*

Bulgular: *Genel olarak, toplam yaralanma insidansı (I) ve sezonal yaralanma insidansı (SIR) 1000 saatte sırasıyla 1.49 (1.33-1.68) ve 8.06 (7.16-0.04) idi. Yaralanma yükü (IB), 11.83 (10.53-13.29) gün ile 51.43 (49.11-53.85) gün arasında değişmekteydi. Yaralanma özellikleri yaş gruplarına göre istatistiksel olarak farklı değildi (p>0.05).*

Sorumlu yazar: Serdar Arslan
Necmettin Erbakan University Faculty of Health Science, Department of Physiotherapy and Rehabilitation Konya, Turkiye
E-posta: *etsarslan@gmail.com*
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Sonuç: *U19 ve U21 yaş gruplarındaki genç futbolcuların, tipik bir futbol sezonunda diğer genç yaş gruplarına göre daha fazla yaralanma yaşadığı görüldü. Daha fazla maç yaralanması olduğu, en çok yaralanan bölgenin uyluk olduğu, kas yaralanmalarının daha sık olduğu ve en sık yaralanan kasın hamstring olduğu sonucuna varıldı.*

Anahtar Sözcükler: *Atletik yaralanmalar, epidemiyoloji, futbol, pediatrik.*

INTRODUCTION

A large number and variety of injuries are encountered in soccer due to the high participation rate and the presence of many intrinsic and extrinsic risk factors (1). The frequency and characteristics of soccer injuries vary according to age and playing level (2, 3). In recent studies conducted on youth male soccer players, the overall injury incidence (I) per season has been reported as 30.3 (4), the injury rate per player as 0.7 (3), and the probability of loss of time in a season because of injury as 50% (5). Match exposure causes more injuries than training exposure (6). Lower extremity injuries (72-93%) are the most common injuries and most of these are non-contact injuries (66%). The ankle (10-38%), knee (8-17%) and groin/hip (7-33%) are the most injured locations. Muscle injuries, which are known to account for 15-87% of all injuries, are the most common injuries among male elite soccer academy athletes (5). More than a quarter of all injuries are serious injuries and these injuries cause significant loss of time (6, 7). In a typical season, 5 -11% of the development process is lost due to injuries (5).

In the light of this information obtained from previous studies, there can be seen to be a need for longitudinal studies to present epidemiological data of different countries and regions (4). One of the obstacles for youth male soccer players to reach professional level is injuries causing significant time loss (3, 4). Injury prevention strategies should be developed and implemented so that the careers of athletes are not interrupted due to time losses because of injuries (2). Establishing effective injury prevention strategies will only be possible by recognizing the frequency and characteristics of injuries (8). Therefore, epidemiological studies of youth male soccer academy athletes seem to be of critical importance (3), just as for other age categories and sports branches.The aim of the current study was to investigate the incidence and characteristics of injuries suffered by elite soccer academy athletes in Turkiye.

MATERIALS and METHODS

A retrospective analysis was made of the health records between 2016 and 2019 of male football academy athletes of an elite sports club. A total of 283 files of 237 athletes were examined. The mean age, height and body weight of the athletes were 17.75 ± 2.50 years, 177.38 ± 5.24 cm, and 68.97 ± 6.22 kg, respectively. The athletes were stratified into age groups: U14 (n=36), U15 (n=40), U16 (n=37), U17 (n=35), U19 (n=43) and U21 (46). The files were evaluated together with 2 medical staff of the elite male soccer academy according to the consensus statement instructions explained below. The data were recorded electronically in the data registration form prepared according to the following characteristics.

The study methods and definitions reflect the consensus statement. The injuries that occurred during soccer training or matches, caused musculoskeletal complaints and were diagnosed by the club medical staff, were defined as soccer injuries. According to the injury mechanism, they were classified as contact, non-contact, overuse, and traumatic injuries. The injury mechanism of recurrent microtrauma without a specific major trauma was recorded as overuse injury. Injuries which occurred as the result of a single trauma were defined as traumatic injuries. If the injury occurred due to physical contact with another player or any object, it was classified as contact injury, and if it occurred without any contact, as non-contact injury. The location and type of injury were noted. The injuries were classified in 4 groups, based on the time the athlete could not participate in training and matches: mild (1-3 days), minor (4-7 days), medium (8-28 days) and major (>28 days). Recurrent injury was defined as an injury to the same body site and of the same type as the previous injury. If the injury recurred within 2 months after full participation in training and matches, it was classified as 'early recurrent', if within 2-12 months as ‘late recurrent’, and if it recurred after 12 months as ‘delayed recurrent’ (9).

The injury incidence (INC), incidence ratio (IR), seasonal incidence rate (SIR), seasonal incidence rate ratio (SIRR) and injury burden (IB) were calculated overall and separately for each age group (3, 6, 7, 9, 10). Considering the occurrence of injuries during training or matches, training, match and total incidence were calculated separately. INC was calculated per age group according to the following formula: ([number of injuries/hours of exposure] X 1000) (9). IR was calculated by comparing the INC for an age group with the overall INC, using the following formula: ([INC of age group]/[INC of overall]) (7). SIR was calculated as the number of athletes with ≥1 injury/the total number of athletes X number of seasons in training (injuries/1,000 person-season) (3,10). SIRR was calculated to compare the rates of age groups using the following formula; [Number of cases for an age group/total number of athletes for an age group]/ [Number of cases for overall athletes /total number of athletes for overall]) (10). IB was calculated using the following formula: median number of time-loss daysX IC (4). To calculate whether match exposure increased the risk of injury based on training exposure, the risk ratio (RR) was calculated (6).

Data were analyzed using SPSS statistical software (version 21.0, IBM Corp., Armonk, NY, USA) and The Open Epidemiological Calculator. The conformity of variables to normal distribution was examined using visual (histogram and probability graphs) and analytical methods (Shapiro Wilk Test). Mean and standard deviation values were calculated for numerical data. Number and percentage distributions were determined for nominal and ordinal data. The comparison of the time loss was made using the Kruskal Wallis test according to age categories. Comparisons of injury characteristics according to age categories were made with the Chi-square test. The Mann Witney U-test and Chi-square test were used to compare muscle injuries. The alpha level for statistical significance was set at 0.05.

RESULTS

The match INC ranged between 3.07 (95% CI, 1.19-7.87) and 23.44 (95% CI, 16.37-33.47) injuries per 1000 hours of soccer match exposure by age groups. The training INC ranged between 0.45 (95% CI, 0.24-0.82) and 1.11 (95% CI, 0.82-1.52) injuries per 1000 hours of soccer training exposure. The match INC was higher for U16 (IR; 1.48 [95% CI, 0.97-2.19]) than for the total group. A lower match INC was found in the U14 group (IR; 0.19 [95% CI 0.06-0.47]). Training INC was highest in U21 (IR; 1.40 [95% CI, 0.99-2.00]) and lowest in U14 (IR; 0.57 [95% CI, 0.28-1.04]). SIR ranged between 1.40 (95% CI, 1.08-1.78) and 9.07 (95% CI, 6.79-11.90) injuries/1.00 season. SIRR was highest in U21 (1.95 [95% CI, 1.51-2.52]), and lowest in U14 (0.23 [95% CI, 0.13-0.39]) (Table-1).

Total IB ranged between 11.83 (10.53-13.29) days and 51.43 (49.11-53.85) days. Training IB was greatest in U17 (6.70 days [95% CI, 5.72-7.86] and match IB was greatest in U16 (492.32 days [95% CI, 464.50-520.20]) (Table-1).

The match INC was higher than training INC for all age groups (Table-1). However, the risk of injury during the match was higher in U21 (RR; 1.55 [95% CI, 0.15- 15.64]), and lower in the U14 (RR; 0.4 [95% CI, 0.02-6.18]) age group (Table-2).

The event, mechanism, severity, and recurrence of injuries were not statistically different by age groups ($p>0.05$, Table-3). According to location, most injuries were seen to occur in the thigh (29%), followed by the knee (17%), ankle (11%) and groin (11%) (Figure-1). Injury location was similar in all the age groups. ($p = 0.083$). Strain (42%) and sprain (17%) were the most common injury types (Table-4). Injury type differed according to the age groups ($p = 0.002$). Fewer strain and sprain injuries were seen in the U14 group, fractures occurred at a higher rate in the U15 group and bursitis / tendinitis injuries were seen more in the U17, U19 and U21 groups.

The most frequent injuries overall and the most common muscle injuries were hamstring injuries, which accounted for 23% of all injuries, and 54% of the muscle injuries. The least common injury was subluxation (1%), and the least common muscle injury was cervical paravertebral strain (1%). Hamstring injuries were observed to be more serious than other muscle injuries ($p = 0.016$). The time loss due to hamstring injuries (15.00 [3.00-60.00]) was greater than the time loss due to other muscle injuries (10.00 [1.00-54.00], $p = 0.010$). Of all the recurring injuries, 42% were hamstring injuries, which recurred more than other muscle injuries ($p = 0.010$).

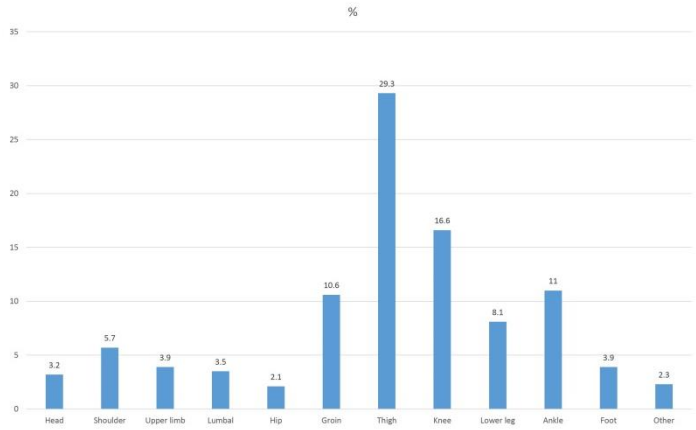

Figure-1. Distribution of all examined injuries by localization.

Table-1. INC, IR, SIR, SIRR, ID and IB by age group.

		U14	U15	U16	U17	U19	U21	Overall
INC (95% CI)	Training	0.45 (0.24-0.82)	0.47 (0.28-0.77)	0.68 (0.44-1.05)	0.75 (0.49-1.15)	1.08 (0.78-1.50)	1.11 (0.82-1.52)	0.79 (0.67-0.93)
	Match	3.07 (1.19-7.87)	18.34 (12.25-27.37)	23.44 (16.37-33.47)	15.89 (10.94-23.02)	14.13 (9.51-20.93)	20.01 (14.36-27.83)	15.86 (13.46-18.67)
	Total	0.59 (0.35-0.99)	1.14 (0.83-1.57)	1.60 (1.21-2.12)	1.62 (1.22-2.14)	1.72 (1.34-2.21)	1.97 (1.56-2.48)	1.49 (1.33-1.68)
IR (95% CI)	Training	0.57 (0.28-1.04)	0.60 (0.34-0.99)	0.86 (0.53-1.36)	0.95 (0.59-1.49)	1.37 (0.95-1.97)	1.40 (0.99-2.00)	1.00
	Match	0.19 (0.06-0.47)	1.16 (0.73-1.78)	1.48 (0.97-2.19)	1.00 (0.65-1.50)	0.89 (0.57-1.36)	1.26 (0.85-1.82)	1.00
	Total	0.39 (0.22-0.66)	0.77 (0.54-1.06)	1.07 (0.79-1.44)	1.08 (0.79-1.46)	1.15 (0.87-1.51)	1.32 (1.02-1.70)	1.00
SIR (95% CI)		1.84 (1.05-3.02)	4.87 (3.50-6.62)	9.07 (6.79-11.90)	9.05 (6.75-11.91)	1.40 (1.08-1.78)	1.57 (1.25-1.97)	8.06 (7.16-0.04)
SIRR (95% CI)		0.23 (0.13-0.39)	0.60 (0.43-0.84)	1.13 (0.82-1.51)	1.12 (0.82-1.51)	1.73 (1.31-2.29)	1.95 (1.51-2.52)	1.00
ID, day, median (min-max)	Training	15.00 (7-45)	19.00 (5-45)	10.00, (4-120)	10.00 (3-30)	14.00 (1-365)	12.50,(1-365)	14.00 (1-365)
	Match	25 (20-30)	13.00 (3-101)	21.00 (2-120)	16.00 (2-185)	14.50 (1-210)	15.50 (2-240)	16.00 (1-240)
	Total	20.00 (7-45)	15.00 (3-101)	15.00 (2-120)	10.00 (2-185)	14.00 (1-365)	15.00 (1-365)	15.00 (1-365)
Injury burden (95% CI)		11.83 (10.53-13.29)	51.43 (49.11-53.85)	24.04 (22.38-25.82)	16.17 (14.80-17.67)	24.07 (22.52-25.73)	29.65 (27.97-31.41)	22.40 (21.74-23.07)

INC: Injury incidence, IR: Incidence ratio, SIR: Seasonal incidence rate, SIRR: seasonal incidence rate ratio, ID:Injury duration, IB: injury burden

Table-2. RR and OR of injury between match and training by age group.

	U14	U15	U16	U17	U19	U21	Overall
RR (95% CI)	0.40 (0.02-6.18)	1.55 (0.15- 15.64)	1.45 (0.28 - 7.36)	1.29 (0.50-5.48)	0.69 (0.28-1.74)	0.85 (0.42-1.73)	1.00 (0.23-4.16)
OR (95% CI)	0.33 (0.16-0.67)	2.28 (1.24-4.29)	3.07 (1.61-5.85)	2.44 (1.22-4.84)	0.22 (0.09-0.47)	0.40 (0.16-0.88)	0.95 (0.51-1.76)

RR: Relative risk, OR: Odds ratio

Table-3. Injury characteristics by age group.

		Overall %(n)	U14 %(n)	U15 %(n)	U16 %(n)	U17 %(n)	U19 %(n)	U21 %(n)	p[a]
Injury event	Match	50.20 (141)	28.57 (4)	60.53 (23)	59.18 (29)	56.25 (27)	40.00 (24)	45.95 (34)	0.089
	Training	49.80 (142)	71.43 (10)	39.47 (15)	40.82 (20)	43.75 (21)	60.00 (36)	54.05 (40)	
Injury Mechanism	Trauma	82.70 (234)	85.71 (12)	81.58 (31)	85.71 (42)	83.33 (40)	75.00 (45)	86.49 (64)	0.597
	Overuse	17.30 (49)	14.29 (2)	18.42 (7)	14.29 (7)	16.67 (8)	25.00 (15)	13.51 (10)	
	Contact	28.60 (81)	35.71 (5)	28.95 (11)	22.45 (11)	33.33 (16)	26.67 (16)	29.73 (22)	0.858
	Non-contact	71.40 (202)	64.29 (9)	71.05 (27)	7755 (38)	66.67 (32)	73.33 (44)	70.27 (52)	
Injury Severity	Minimal (1-3 days)	10.60 (30)	-	13.16 (5)	6.12 (3)	12.50 (6)	11.67 (7)	12.16 (9)	0.332
	Mild (4-7 days)	23.00 (65)	7.14 (1)	18.42 (7)	26.53 (13)	22.92 (11)	23.33 (14)	25.68 (19)	
	Medium (8-28 days)	38.20 (108)	71.42 (10)	52.63 (20)	32.65 (16)	31.25 (15)	38.33 (23)	32.43 (24)	
	Major (>28 days)	28.30 (80)	21.43 (3)	15.79 (6)	34.69 (17)	33.33 (16)	26.67 (16)	29.73 (22)	
Recurrence	No recurrence	84.90 (240)	100.00 (14)	92.11 (35)	77.55 (38)	87.50 (42)	85.00 (51)	81.08 (60)	0.698
	Early recurrence (<2 months)	6.40 (18)	-	2.63 (1)	10.20 (5)	8.33 (4)	3.33 (2)	8.11 (6)	
	Late recurrence (2-12 months)	6.00 (17)	-	2.63 (1)	8.16 (4)	4.17 (2)	10.00 (6)	5.41 (4)	
	Delayed Recurrence (>12 months)	2.80 (8)	-	2.63 (1)	4.08 (2)	-	1.67 (1)	5.41 (4)	

n: number of injuries, [a]Multifold chi-square

Table-4. Injury type by age group.

Injury type	Overall % (n)	U14 % (n)	U15 % (n)	U16 % (n)	U17 % (n)	U19 % (n)	U21 % (n)
Concussion	1.40 (4)	-	2.60 (1)	-	-	5.00 (3)	-
Fracture	10.60 (30)	28.6(4)	28.90 (11)	4.10 (2)	6.30 (3)	8.30 (5)	6.80 (5)
Dislocation	3.20 (9)	-	-	6.10 (3)	6.30 (3)	3.40 (2)	1.40 (1)
Meniscus lesion	4.90 (14)	-	-	6.10 (3)	4.20 (2)	1.70 (1)	10.80 (8)
Strain	42.00 (119)	50.0 (7)	47.40(18)	51.00 (25)	39.60 (19)	33.30 (20)	40.5 (30)
Sprain	17.30 (49)	14.30 (2)	13.20 (5)	12.20 (6)	22.90 (11)	20.00 (12)	17.60 (13)
Contusion	7.10 (20)	7.10 (1)	7.90 (3)	10.2 (5)	8.30 (4)	3.40 (2)	6.80 (5)
Bursitis-tendinitis	8.10 (23)	-	-	4.10 (2)	12.50 (6)	13.30 (8)	9.50 (7)
Periositis	3.90 (11)	-	-	6.10 (3)	-	8.30 (5)	4.10 (3)
Skin	1.40 (4)	-	-	-	-	3.40 (2)	2.70 (2)

n: number of injuries

DISCUSSION

The study results showed INC close to the lower limit of INC reported in the literature. However, the results showed a higher rate of match injuries than training injuries, the thigh was the most injured area, muscle injuries were more common, and the muscle most commonly injured was the hamstring. However, serious injuries comprised a quarter of all injuries.

In the literature, match and training INC have been reported at varying rates for youth soccer players. Bianco, A. et al reported that match and training INC were 1.15 (0.9-1.4) and 2.84 (1.9-4.3) in U11-U20 soccer players, respectively (11). Bowen, L. reported the match INC as 33.5 and training INC as 7.9 for the U18-U21 age groups (12). In a systematic review, pooled INC were given as 7.9 (95% CI, 4.4-14.5), 3.7 (95% CI, 1.0--13.9) and 5.8 (95% CI, 3.4-10.0) for U17-U21, U9-U16 and U9-21 age groups, respectively (5). The current study results indicated that total INC was 1.5 (95% CI, 1.3-1.7) for the U14-U21 age groups. According to the current study results, the match INC was higher in the U16 age group, while the training INC was higher in the U21 age group than in the other groups. The higher match INC in the U16 age group compared to the older age groups can be attributed to the inadequate development of tactical and technical skills (13). However, the U21 age group has to train more with seniors and competition at this level increases the training load, and an increased training load causes injuries (14). Current and previous studies have indicated that INC may differ in youth soccer players. Factors such as exposure times, training volume and intensity, ethnicity and coaching may be the reason for the variability in INC (3, 6, 15).

A point of agreement in the literature on this subject is that the match INC is higher than the training INC for all age categories. It has been reported that injuries occurring during the match constitute 51-66% of all injuries (16). In the current study, 50% of the injuries reported occurred during matches. However, it has been emphasized that the risk of injury in matches for some age groups is higher than for other age groups. Renshaw, A. et al reported that exposure to matches entailed a greater risk of injury than exposure to training in the age groups of U15 (RR; 1.1 [95% CI, 0.6 to 2.4]) and U16 (RR; 1.8 [95% CI, 0.6 to 4.9]) (6). In the current study, matches were seen to be a greater risk than training for the U15 (RR; 1.6 [95% CI, 0.2- 15.6]) and U16 (RR; 1.5 [95% CI, 0.3 - 7.4]) age groups than for other age groups. The relationship between biological maturation and injury explains why the risk is higher in these age groups. The peak age of biological maturation in adolescent males is between 14 and 16 years (17). More injuries occur in this period, as variables that determine motor control such as muscle strength and agonist-antagonist contraction mechanics do not develop until biological maturation is completed (18).

Physical fitness parameters such as strength, endurance and coordination are not sufficiently developed in younger age groups (13). Therefore, it has been claimed that younger age groups are more susceptible to soccer injuries (19). However, the results of current study contradict this information. One of the results of the current study was that SIRR was higher in the U19 and U21 age groups than in the other groups, indicating that more injuries are seen in the U19 and U21 age groups than in other groups in a typical season. However, it was also seen that total IC tends to increase with age. This reflects that injuries in youth male soccer players occur as a result of the interaction of multifactorial components (1). Maturation is an important risk factor for soccer injuries in young athletes (7, 19), but it is not the only risk factor (8). Increased competition, increased intensity of matches and training, and increased career concerns may lead to an increase in injuries as age advances (20).

Materne, O. et al reported that in youth male elite soccer academy athletes, IB was lowest in childhood (U9-12), increased in early and middle adolescence (U13-U17) and reached its highest level in late adolescence (U18-U19) (4). However, there are also studies that do not support this and have reported that the IB in early and middle adolescence is higher. Bult, H. J. et al reported that the total IB for male youth soccer players in the U12-U19 age groups ranged from 37.1 (95% CI, 33.7-40.8) days to 86.5 (95% CI, 81.6-91.7) days per 1000 hours. At the same time, the group with the highest IB was U16, and the group with the lowest IB was U14 (7). As a result of the current study, the IB was found to be between 11.8 (95% CI, 10.5-13.3) days and 51.4 (95% CI, 49.1-53.9) days per 1000 hours for age groups between U14 and U21. While the age group with the highest IB was U15, the group with the lowest IB was U14.

It is known that lower extremity injuries in youth soccer players constitute 72-93% of all injuries (21, 22). However, Jones, S. et al reported that ankle (10-38%), knee (8-17%) and groin/hip (7-33%) injuries were the most common injuries (5). In another study, Hall, E. C. et al reported that the most common lower extremity injuries were to the thigh (approximately 25%) (3). The current study results also showed that lower extremity injuries (82%) were the most common injuries, and the most affected areas were the thigh (29%), knee (17%) and ankle (11%).

Studies have reported that the proportion of injury types varies. Muscle injuries (15-87%), ligament injuries (1-21%), contusion (7-31%), tendon-related injuries (3-13%), joint injuries (3-32%) and fracture (2-9%) are the most frequent injuries (5). The results of the current study regarding the type of injury were consistent with the literature. Muscle injuries (42%), ligament injuries (17%), fracture (10%), buristis-tendinitis (8%) and contusion (7%) were the most common injuries. There is a consensus that muscle injuries, which are known to account for 15-87% of all injuries, are the most common injuries among male elite soccer academy athletes (5). It has also been reported that the most injured muscle is the hamstring in elite male youth soccer academy athletes. Recent studies have reported that hamstring injuries account for 39% of muscle injuries and 12% of all injuries (3). In the current study, muscle injuries accounted for 42% of all injuries. The most common injuries overall and the most common muscle injuries were hamstring injuries, which accounted for 23% of all injuries, and 54% of the muscle injuries. The eccentric load and moderate tension that the hamstrings are exposed to during running have been shown to be the most important factors that play a role in the etiology of hamstring injuries (23). However, in young players the mechanical properties of muscles such as strength, flexibility, and the shock absorption ability of the muscles have not yet developed at a level to meet the repetitive performance of activities that require massive force such as shooting and sprinting required by soccer (24). There may also be repetitive muscle damage, which is one of the predisposing factors of hamstring injuries according to the literature (25).

Another important issue related to injuries in youth soccer players is recurring injuries. Ergün, M. et al reported the rate of injury recurrence as 25% in youth national soccer team players (26). Renshaw, A. et al reported that the recurrence rate for youth male soccer academy athletes ranged from 6% to 15% (6). In the current study, approximately 15% of the injuries were seen to be recurrent injuries, and hamstring muscle injuries recurred the most (42%). Well-structured rehabilitation programs that induce functional and structural recovery, and support technical and tactical development, will facilitate adaptation to a return to sports and reduce the risk of re-injury (27). One of the most important questions about returning to soccer after an injury is about the

timing of this return. Returning before functional and structural recovery is complete may cause re-injury. However, returning late will interrupt the development of the athlete. Using evidence-based return criteria to decide on the return of injured athletes to sports will allow athletes to return to sports with a better fitness level than the pre-injury level (28). Thus, the risk of re-injury will be minimized. In addition, it is extremely important that the recovery process is known to other members of the rehabilitation team, especially the athlete and the trainer, because the perception of rehabilitation as the relief of symptoms such as pain, etc. will make both the athlete and the trainer make mistakes about the time to return to sports after injury and will prepare the ground for re-injury (8, 20).

There were some limitations to this study, primarily that there was no information about the causes of injury. If records were kept regarding the physical, social and mental causes of the injuries, the reasons for the injuries could be discussed and the results of the study could be used for preventive programs to be created.

CONCLUSION

INC was close to the lower band of the limits reported in the literature. Match injuries were seen at a higher rate than training injuries. The most frequently injured area was the thigh, and the most common type of injury was muscle injury. However, the high proportions of serious injuries and hamstring injuries seem to be the most striking results of the study.

Conflict of interests: The authors have no conflict of interests to declare regarding the publication of this manuscript.

Ethical considerations

This study was approved by the Council on the Ethics of Non-Pharmaceutical and Non-Medical

Research of the Medicin Faculty of Necmettin Erbakan University (Date: June 21, 2019; Decision number: 2019/21923)

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