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Soccer and Gender Effect of Groin Pain

Geschlechtsspezifische Unterschiede von Leistenschmerzen im Fußball

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SUMMARY

Problem: Groin pain is common in soccer players but the prevalence has only been examined in uncontrolled studies.

Methods: 479 male soccer players aged 25 years (17 - 43) (mean with range), 144 female soccer players aged 23 years (16 - 47), 74 men with no history of soccer training aged 26 years (16 - 42) and 94 women with no history of soccer training aged 23 years (range 15 - 43) answered a mailed questionnaire that included specific questions on groin pain and training history. Data are presented as proportions (%) or as mean with 95% confidence intervals (95% CI).

Results: 55% male soccer players and 26% male controls had experienced groin pain, resulting in an odds ratio (OR) of 3.7 (95% CI 2.1, 6.6). The corresponding proportions were in female soccer players 28% and in female controls 13% giving an OR of 2.8 (95% CI 1.4, 5.8). When comparing the genders the higher proportion of males than females that had experienced groin pain resulted in an OR of 2.9 (95% CI 1.9, 4.5) for male versus female soccer players and an OR of 2.6 (95% CI 1.1, 5.3) for male versus female controls.

Discussion: Playing soccer and being of the male gender are factors associated with a higher risk of experiencing groin pain.

Key Words: controls, female, groin, male, soccer, pain, retrospective

ZUSAMMENFASSUNG

Problem: Leistenschmerz ist ein häufig auftretendes Symptom bei Fußballspielern, die Prävalenz ist bisher jedoch nur in unkontrollierten Studien untersucht worden. Unsere Absicht war, Leistenschmerzen bei männlichen und weiblichen Fußballspielern in einer kontrollierten Studie zu untersuchen.

Methoden: 479 Fußballspieler, Durchschnittsalter 25 Jahre, (17 - 43), 144 Fußballspielerinnen, Durchschnittsalter 23 Jahre (16 - 47), 74 Männer anamnestisch ohne Fußballtraining, Durchschnittsalter 26 Jahre (16 - 42), und 94 Frauen anamnestisch ohne Fußballtraining, Durchschnittsalter 23 Jahre (15 - 43), beantworteten einen per Post zugeschickten Fragebogen mit spezifisch gerichteten Fragen bezueglich Leistenschmerz und Trainingsanamnese. Die Daten werden prozentual (%) oder als Mittelwert mit 95% Konfidenzintervall (95% CI) angegeben.

Resultate: 55% der Fußballspieler und 26% der Männer der Kontrollgruppe hatten Leistenschmerzen empfunden, was in einer Odds Ratio (OR) von 3.7 (95% CI 2.1, 6.6) resultiert. Die enstprechenden Verhältnisse waren bei den Fußballspielerinnen 28% und bei der weiblichen Kontrollgruppe 13%, resultierend in einer OR von 2.8 (95% CI 1.4, 5.8). Beim Vergleich zwischen Männern und Frauen zeigt sich ein höherer Anteil Leistenschmerzen bei den Männern, was einer OR von 2.9 (95% CI 1.9, 4.5) bezueglich männliche versus weibliche Fußballspieler und einer OR von 2.6 (95% CI 1.1, 5.3) bezueglich männliche versus weibliche Kontrollgruppe entspricht.

Diskussion: Sowohl das Trainieren von Fußball als auch die Tatsache, Mann zu sein, sind Faktoren, die mit einem höheren Risiko assoziiert werden, Leistenschmerzen zu empfinden.

Schlüsselwörter: Kontrollgruppe, weiblich, Leiste, männlich, Fußball, Schmerz, retrospektiv

INTRODUCTION

Injuries that result in groin pain account for up to 14% of all sport related injuries (2,3,7,9,11-14,16,18,21,24,27-29,31,32,40), up to 6% of injuries that occur in female soccer players (2,3,10,16,19,25,31,35,37) and up to 8% of injuries in male soccer players (2,8,9,16,31,39,40). Groin pain results in a substantial health care burden as soccer is the most popular sport worldwide (5) and one of the sports with the highest prevalence of groin pain (1,2,9,13,14,17,18). Groin pain is a symptom that can be the result of a variety of disorders such as hernia, pubic bone edema, avulsion fractures, adductor sprains, adductor inflammations, external oblique tear, nerve entrapment, rectus abdominis tear, prostatitis, intraarticular hip leasions, femuroacetabular impingement and hip osteoarthritis (21,25-29,34,35,40). Therefore it could be difficult to determine the primary diagnosis (2,18,27,28,40) and probably the reason why many epidemiological studies report the prevalence or incidence of groin pain without specifying the underlying diagnosis (2,3,7,9,11-15,21,24,27-29,32,40).

The epidemiology of groin pain in soccer players is however thoroughly examined in both male (2,9,40) and female players (2,3,10,14,19,26,35). But all these studies have an uncontrolled study design and the definition of groin pain and data collection differs between the studies, something that makes direct gender comparison difficult.

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	Men					
	Groin pain			No groin pain		
	Cases	Controls	p-value	Cases	Controls	p-value
Numbers and proportions (%)	264 (55%)	19 (26%)	<0.001	215 (45%)	55 (74%)	<0.001
Age at onset of groin pain (years)	20.5±4.5	20.7±6.5	0.91	----	----	----
Numbers and proportions (%) with insidious onset of groin pain	201 (76%)	12 (65%)	<0.05	----	----	----
Age at follow-up (years)	22.7±4.3	24.6±5.9	0.07	22.2±4.5	26.1±6.1	<0.01
Weight (kg)	77±7	74±10	<0.01	76±8	78±7	0.35
Height (cm)	181±6	177±7	0.11	181±6	182±14	0.09

Table 1: Characteristics of male (n=479) soccer players and male (n=74)) controls with or without groin pain. Data is presented as mean ± 1 standard deviation (SD) or as numbers with proportions (%). P<0.05 is regarded as a statistical significant difference.

AIM

We designed a controlled study, hypothesising that groin pain (i) is more common in soccer players than controls and in athletes within other sports, (ii) more common in men than women. Our primary end points variables as to answer our specific reference questions were incidence of groin pain in relation to soccer, other sports or no sports, with special reference to gender differences and differences between the subgroups. As secondary end point we evaluated age at onset and type of onset, also with special reference to gender differences and differences between the subgroups.

MATERIALS AND METHODS

For this study we invited all male soccer players in the 15 top three divisions and 15 teams in the next four divisions and all female soccer players in the 8 top three divisions in the county of Skåne. Skåne includes the south part of Sweden, a region with 1.2 million inhabitants. Together the teams included 861 soccer players and 623 accepted our invitation, resulting in a participation rate of 72% There were 479 men with a mean age of 25 years (range 17 - 43) and 144 women with a mean age of 23 years (range 16 - 47).

317 individuals in the same age range, randomly chosen from the central data files that include all inhabitants in the region of Skåne were invited to serve as control cohort. 199 replied, giving a participation rate of 63%. We excluded 31 individuals from the control cohort who played soccer resulting in a final control cohort of 74 men with a mean age of 26 years (range 16 - 42) and 94 women with a mean age of 23 years (range 15 - 43). In the control cohort, there were 28 men with a mean age of 28 years (range 22 - 42) and 38 women with a mean age of 24 years (20 - 36) who participated in sports other than soccer.

All individuals answered a mailed questionnaire that registered (i) age and gender, (ii) anthropometry, (iii) history of groin pain defined as groin, pubic, or adductor pain for more than one week, (iv) age at the first episode of groin pain, (v) type of onset of the pain, where acute was defined as pain occurring within one minute after an injury and insidious as pain occurring more than one minute after injury, (vi) participation in other sports defined in nine categories; weight lifting, aerobics, running, cycling, walking, swimming, hockey, court-ball sports (basketball or handball), and other sports. These questions were forwarded to give us the possibility to evaluate our primary and secondary research questions.

The study was approved by the Ethical Committee at Lund University, Sweden and conducted according to the declaration of Helsinki. We evaluated group differences by Students t-test between means, Chi-square test or Fischer's exact test. We utilized linear logistic regression to calculate Odd Ratios (OR) adjusted for age at evaluation. Data are presented as numbers and proportions, means with ranges, means ± standard deviations (SD) or means with 95% confidence intervals (95% CI). P<0.05 was regarded as a statistically significant difference.

RESULTS

Soccer players versus all controls

264 male soccer players (55%) and 19 male non-soccer players (26%) had a history of groin pain, giving an OR of 3.7 (95% CI 2.1, 6.6). Forty-one female soccer players (28%) and 12 female non-soccer players (13%) had experienced groin pain, giving an OR of 2.8 (95% CI 1.4, 5.8). Groin pain was more common in male than female soccer players with an OR of 2.9 (95% CI 1.9, 4.5) and in male than in female controls with an OR of 2.6 (95% CI 1.1, 5.3).

Soccer players versus controls active in sports other than soccer

When being compared to individuals participating in sports other than soccer, soccer players had experienced more groin pain than their counterparts. 264 (55%) male soccer players again experienced groin pain compared to 8 (29%) male individuals active in other sports, resulting in an OR of 3.5 (95% CI 2.5, 8.5). Among women the corresponding number was 41 (28%) female soccer players and 3 (8%) female individuals active in other sports, resulting in an OR of 5.0 (95% CI 1.4, 17.3). Finally, the proportion of individuals who had experienced groin pain was no different when comparing male and female controls that did or did not participate in sports other than soccer (data not shown).

Age at onset of groin pain

Among the individuals who had had groin pain, the mean age at first episode was 21 years (range 7 - 42) in male soccer players and 21 years (range 10 - 33) in male controls (NS) (Tab 1). The corres-

	Women					
	Groin pain			No groin pain		
	Cases	Controls	p-value	Cases	Controls	p-value
Numbers and proportions (%)	41 (28%)	12 (13%)	<0.01	103 (72%)	82 (87%)	<0.01
Age at onset of groin pain (years)	18.6±4.1	20.0±6.7	0.42	----	----	----
Numbers and proportions (%) with insidious onset of groin pain	33 (80%)	6 (50%)	<0.05	----	----	----
Age at follow-up (years)	21.3±4.6	22.3±5.3	0.50	20.7±5.1	23.5±5.9	<0.01
Weight (kg)	62±6	63±6	0.75	61±6	63±12	0.21
Height (cm)	169±5	165±12	<0.05	167±5	168±7	0.76

Table 2: Characteristics of female (n=144) soccer players and female (n=94) controls with or without groin pain. Data is presented as mean ± 1 standard deviation (SD) or as numbers with proportions (%). P<0.05 is regarded as a statistical significant difference.

ponding ages for female soccer players was 19 years (range 12 - 30) and for female controls 20 years (range 11 - 32) (NS). In the gender comparison, female soccer players were younger than male players when they experienced their first episode of groin pain (p<0.05).

Type of onset of groin pain

For individuals having experienced groin pain, an insidious onset was reported in 76% of male soccer players and 65% of male controls (p<0.05) (Tab 1). The corresponding proportions in female soccer players with a history of groin pain was 80% and in female controls with groin pain 50% (p<0.05). The proportions of individuals with insidious onset were similar when comparing male and female soccer players and when comparing male and female controls.

DISCUSSION

This study infers that groin pain is (i) more common in male and female soccer players compared to male and female controls as well as male and female individuals active in sports other than soccer, (ii) more common in males versus females soccer players. In addition, we see that female soccer players experience the first episode of groin pain at an earlier age than male players and that the groin pain in male and female players are more prone to have an insidious onset than in male and female controls. That is, participation in soccer and male gender are associated with a high risk of having experienced groin pain.

The reason for the high proportion of soccer players that had experienced groin pain can only be speculative but groin pain frequently occurs in sports with high strain in the groin or on the adductors (1,23,26-28,31-33), commonly found in soccer (1,16,23,26-28,31,32). Muscle injuries often arise during eccentric contraction (27,28), frequent in soccer during tackling or running and soccer also includes quick accelerations and decelerations, cutting, pivoting kicking and twisting movements, (9,22,26-28,32,33). These facts are probably one reason for the high prevalence found in soccer players (1,9,16,22,26-28,31,32). The notion is supported in the literature which infers 30–62% of all groin injuries in athletes to be the result of tackling and cutting leading to injuries in the adductor muscles (4,9,22,26-28,32,33).

It is of interest that the risk of sustaining groin pain seems to be sport specific, as the proportion of both male and female soccer players that had experienced groin pain was greater than in men and women active in other sports. Additionally, the proportion of individuals that had experienced groin pain was similar in controls that did not participate in any sport and those who participated in sports other than soccer. The results imply that soccer, not exercise in general, is a risk factor for groin pain. This is supported in the literature which infers that up to 22% of athletes with groin pain actually play soccer (2,19). However, it is possible that soccer players and the control who participated in sports other than soccer exercised with different intensities and with different duration, factors probably also influencing the risk of groin pain (15,20). This notion is supported in literature where a variety of sports, when practiced on a competitive level, has been shown to associate with a high prevalence of groin pain (1,23,26-28,31-33).

We found that groin pain seemed to be more common in men than in women, also supported in the literature (2,16,21,31,35,37,38). We speculate that this partly can be the result of the greater joint laxity in women than in men (30). The ligamentous laxity in the female hip may be protective for adductor injuries, as it allows for a greater range of motion giving a lower risk for adductor tears (30,36). The gender differences also found in controls support this hypothesis. Another influencing factor could be the higher weight in male than female soccer players leading to an exposure to more intense speed and a higher degree of trauma during an exercise session, two conditions that could result in greater forces in the groin region in male than in female soccer players (1). Our inferences is supported in one recent published prospective study that evaluated professional soccer players, a study that reported acute groin injuries to be 3 times more common in male than female players (40). However, our study adds knowledge compared to the cited study since we also included players on lower level of exercise, not only compared groin pain incidence with other athletes but also with non-athletic controls and evaluated groin pain during a longer period.

In this study we found a higher proportion of soccer players having experienced groin pain than most cited reports (3,9,10,31). The reason is probably that we in our definition of groin pain also included individuals with only a short duration of symptoms and

symptoms at a level so that they could continue with soccer training. Our data also supports the view that only a minority experience acute onset of the pain (6,10). The finding coincides with the frequently reported chronic nature of athletic groin pain (12,27,28,31,32). Insidious onset was more common in soccer players with pain than in controls with pain possibly indicating that the specific underlying diagnosis could be different in soccer players and controls.

The main advantages of the study are the controlled setup not previously used in evaluation of groin pain in soccer players, inclusion of one of the largest sample sizes of soccer players with groin pain, the gender specific evaluation and the comparison with not only sedentary individuals, but also with controls active in sports other than soccer. The weaknesses include the retrospective design introducing a risk of recall-bias, usually leading to an underestimation of the true incidence of injuries (20). The inferences in this study ought therefore to be verified or refuted in prospective controlled studies. Furthermore, it would have been advantageous to also register the number of events, severity and duration of each event. Another weakness is that the attendance rate between controls and soccer players is large and thus there may be a sampling error in the controls. A had been beneficial with a larger control sample.

CONCLUSION

We conclude that soccer exercise and male gender seems to be associated with a high risk of experiencing groin pain.

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