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ABSTRACT

The purpose of this study was to record retrospectively the epidemiology of injuries in amateur Greek soccer players. Three hundred and one (301) amateur soccer players voluntarily participated in the study. Participants answered a specially-designed questionnaire that included questions about demographics, playing surface, division, position, hours of training plus participation, the use of stretching or prophylactic tape, the injury mechanism, the location and type of injury. During the five years these soccer players sustained a total of 1.745 injuries, that diagnosed by the orthopedist of the team. Most of injuries were strains (33%), overuse (27%) and sprains (25%). The location of injuries was the thigh (38 %), ankle (27%) and knee (13%). There was a significant difference in the total number of injuries among soccer players with or without scoliosis ($t = 3.152$, $p < 0.05$) and players that played on sand/dirt (gravel), who sustained more injuries than the players who played on artificial grass or on grass ($t = 3.413$, $p < 0.05$). No differences were found in the other measurement parameters. The results of our study shows that spine deformities and ground surfaces are the factors that causes more injuries in amateur Greek soccer players.

KEY WORDS: *amateur soccer players, sprains, strains, overuse, scoliosis.*

INTRODUCTION

The incidence of soccer injuries has been investigated in several studies (3, 11). The results differ somewhat because of differences in the population characteristics, and playing surfaces. Studies regarding the skill levels show partly contradictory results. Ekstrand & Tropp (5) and Nielsen & Yde (19), have reported that high-level players have a higher incidence of injury in games, but a lower incidence in training sessions than low-level players. Inklaar et al (12), found that high-level teams have a significantly higher risk of injury than teams at a lower level of play. Conversely Blaser and Aeschlimann (2), reported just the opposite. In an other study Poulsen et al (21), found no difference in the injury rate between high-level and low-level football players. Contradictory are the results of studies according to playing surfaces (6).

In Greece there is a dramatic increase in playing soccer, after the European championship in June 2004, where the National team of Greek of football gained the league. Today according to the Hellenic football federation, there are 5.182 amateur teams with 500.000 registered amateur players.

The amateur championship in our country is carried out in domestic (local) level. The pre-season period starts on August 15 and lasts one month. After that, the regular championship starts on the 20th of September and finishes in the beginning of June.

The championship is carried out on differing playing surfaces, such as sand/dirt. Only in the last three years have the playing surfaces of the amateur categories begun being changed and replaced by artificial grass. In reviewing the relevant literature no studies were found to investigate the soccer injuries on similar playing surfaces as in our country.

The aim of this investigation is to determine retrospectively the epidemiology of injuries in amateur male soccer players who participated in domestic championship in the Attica area.

METHODS

The present study approved by the ethics committee of the Athens University Medical Faculty in January 2004. The subjects recruited in the study were 301 amateur soccer players from the eastern Attica region, and particularly from teams participating in the domestic championship. All soccer players received a written explanation of the trial before entry into the study and then gave their signed consent to participate. The individual data of the soccer injury reports were evaluated under the form of interview by a specialized clinical orthopedist and were recorded in a special questionnaire (15). This instrument was modified in such a way as to meet the demands of our study.

Soccer players reported any kind of injury that they had suffered during soccer participation and the orthopedist recorded their characteristics.

The definition of «soccer injury» employed was «as injury defined any physical complaint associated with soccer (received during preseason preparation, practice or a match), that limits athletic participation for at least the day after the day of the onset was defined. A player was as injured until he/she was able to participate again fully in matches and/or in practice sessions» (27).

Other information included the age, the athletic experience, (total years of participation in soccer, years of participation in the present division), the player's position, the number of games participated in, the daily, weekly and annual practice hours. Also, additional information was sought concerning the playing surface of the soccer players, as well as body mass, height, spine deformities (kyphosis, scoliosis, lordosis) and lower extremities discrepancy such as genu valgum or genu varum and flat-footedness.

All data was processed on a PC computer using Microsoft Office (Microsoft Corp., Redmond, Washington). The statistical procedures were performed using SPSS (version 10.0; SPSS, Inc., Chicago Illinois). Methods applied were frequencies, cross-tabulations, descriptive, and means. Differences between groups were examined by t-tests, or chi-square tests. Unless otherwise stated, only results that were significant at the 5% or less level are presented (15).

RESULTS

In the retrospective questionnaire of our study, the 301 players surveyed reported a total of 1.745 previous injuries that prevented them from participating in their usual sporting activities for at least one day. This accounted for a rate of 5.8 injuries per player. Almost 78% of the injuries occurred in the lower extremities.

Most of the injuries were strains, followed by overuse, sprains and contusions. The injuries sustained to the thigh were strains, contusions and overuse. Of all the knee injuries, a medial meniscus sprain was diagnosed in 90 amateur players, while 24 injuries occurred in the lateral meniscus. The anterior cruciate ligament was injured in 26 players, while 15 cases were injured in the medial collateral ligament.

The overuse injuries that recorded were achilles tendonitis, compartment syndromes, chondromalacia patella and bicipital tendonitis.

Most strains were occurred in the muscle of the lower extremities. Thirty one of the injuries occurred between 75-90 minute of the match ($p < 0.001$). Sixteen percent of the injuries occurred during first quarter of the first-half of the match, 9.2% during the second quarter of the first-half and 11.4% during the third quarter of the first-half. A large proportion of the injuries occurred

during the last quarter of the second-half (31.2%), 24.6% during the 60-75th min and 24.6% during 60-75th min ($p < 0.001$).

Most of the injuries occurred during championship games (41.7%), 14.2% in friendly matches, and the rest of the injuries occurred during practice ($p > 0.001$).

Midfielders and strikers had the higher incidence of injuries (22%) compared with the defenders (19%) and goalkeepers (16%).

The majority of injured players ($n = 168$) were injured more than once. Seventy players were injured twice, 34 three times, 30 four times, 10 five times, and 24 more than five times. Seventy players (23%) suffered only mild injuries, 100 (33%) had moderate injuries, and 77 players (29%) had suffered at least one severe injury.

There was a significant difference in the number of injuries between soccer players with or without scoliosis ($t = 3.152$, $p < 0.05$). Also, players who played on sad-dirt surf aces had sustained more injuries than the players who played on artificial grass or on grass ($t = 3.413$, $p < 0.05$).

No significant relationship was observed between the total number of injuries and age, body mass and height, other spine deformities, team division, training age, playing position and practice or game.

The combination of physical therapy with medicine and taping together or separately was the most common rehabilitation method (28.8%, 22.5% & 24.3%, respectively), while physical therapy alone constituted the treatment medium in a percentage of 13.5%. The most common time absence from practice was one week (23.4%), while the relatively high percentage were time intervals of one month (8.1%), two weeks (7.2%) and 3, 5 and 2 days (10.8%, 8.1% & 7.2%, respectively). The larger percentage of injuries did not cause absence from the matches (33.3%), while the immediately more frequent absence was a duration of one week (24.3%).

DISCUSSION

The present epidemiological study was conducted with the purpose to record the frequency and type of injuries suffered by amateur Greek players. Also, to find out if amateurs that playing in surfaces such as dirt/sand suffering more injuries. Therefore, 301 subjects that playing in the domestic championship of Attica area voluntarily participated in the study and answered a specially-designed questionnaire. The results revealed a high injury frequency during match play as well as a comparably lower frequency during training. An important finding of this investigation-particularly with respect to the individual consequences-is the frequent occurrence of a relationship between playing surface and total number of injuries.

We found that the amateur soccer players reported 1.745 previous injuries, which translates to an average, 5.8 injuries per player (SD, 6.6). This rate was slightly lower than in the study by Junge & Dvorak (14). These researchers surveyed 588 players retrospectively and reported a total of 3.848 previous injuries ($6.6 \pm \text{SD}, 8.8$).

It is known that the results from retrospective questionnaires concerning the frequency of injury should be interpreted with caution. The reliability of retrospective assessments is limited by the effects of memory such as recall bias (10, 26). However, retrospective data collection seems valid enough to evaluate the proportion of different circumstances of injury and of body parts injured.

Also, in the analysis of the retrospective data, the amount of participation in football was overestimated because the temporary absence of players from training and games was neglected in the calculation. This resulted in a further substantial underestimation of the «real» incidence of injuries using retrospective assessment. However, the relative distribution of location and circumstances of injury as well as the proportion of injuries due to contact and due to fouls were similar in the prospective and the retrospective data (9, 25).

A percentage of 78% of the injuries that are recorded in our study occurred in the lower extremities. These results are in line with other reports (20, 4, 14, 19, 18, 22, 23), in which most of the injuries occurred in the lower extremities. Inklaar (11), also concluded from his review of the literature that 61% to 90% of all injuries occurred in lower extremities.

Strains, sprains, and contusions represented over 85% of all injuries to amateur players. In a previous study in another domestic championship in Larissa region Stergioulas (23), found that strains were the most frequent type of injury in amateur soccer players. Kibler (16), found that contusions accounted for 32%, muscle strains for 24.5% of the total, sprains for 21.8% and fractures accounted for 9%. Jensen et al (12), found that the most frequent injuries were sprains (46%), contusions (25%) and fractures (17%). Many other studies confirm that the most common types of injuries are strains, sprains, contusions, overuse and fractures, but with differences in the exact percentages. This differentiation among the above studies is due to the injury definition employed. The high proportion of strains observed during competition (35%) and in training (53%) is a cause for concern, as this level is higher than that reported for European teams. Ekstrand & Gillquist (4), has discussed the relation between muscle tightness and a player's propensity for muscle strains and shown the beneficial effects of warm up and cool down programs for reducing muscle tightness and the number of muscle strains. It is possible that the attention paid to general body conditioning -for example, through strength and flexibility training and warm ups and cool down - is less than that found at professional teams, thus making players in domestic cate-

gories more liable to muscle strains. This view is also supported by the general lack of awareness found among amateur players in the present study of the benefits of injury prevention strategies.

The 27% of overuse injuries that we recorded was slightly less than that in the study by Nielsen & Yde (18), who recorded 34% overuse injuries in 123 players participating in various competition levels in a Danish soccer club. Conversely, Luthie et al (17), in their study in 12 teams playing at the highest competition level in Finland in 1993 recorded only 6% overuse injuries. So, according to the soccer level, the frequency of overuse injuries varies between 6% to 34% (19, 22, 23).

Midfielders and strikers had the higher incidence of injuries (22%) compared with defenders (19%) and goalkeepers (16%).

The factor that played a role was scoliosis, which increased the number of injuries to the players. It is believed that the existence of mechanical deformities, mainly of the spine, increase the risk of the injury rate in amateur soccer players (1, 5, 7, 18, 21, 28).

Also, we found a relation between playing surface and total number of injuries, an observation that was expected. Many championships in our county, mainly in big cities such as Athens, Pireaus and Thessaloniki, were carried out on surfaces consisting from gravel, coal, dirt or a mix of these three components. Ekstrand & Nigg (6), reported that 24% of their recorded injuries were caused not only by poor playing surface, but also by other factors. Conversely, Arnason et al (1), showed that significantly more injuries per hour of play or practice occurred on artificial turf than on grass or gravel. Our results are partly similar with these studies, although there can be no absolute comparison.

The other variables such as age, body mass, height, practice level of players, years of experience, playing position, and the hours of participation in practice or in games did not play a role in the total number of injuries.

In the present study, we found retrospectively that spine deformities such as scoliosis and playing surfaces caused more injuries in amateur soccer players. We also found that injuries were most frequently located in the lower extremities and were identified as sprains, strains and overuse.

Appendix

Demographics

Age..... Height..... Body mass.....

Number of games.....

Playing surface: Grass..... Artificial grass..... Gravel (mix of dirt & sand).....

Years of participation.....

Playing position: Midfielder..... Striker..... Defender..... Goalkeeper:.....
Spine deformity: Scoliosis..... Lordosis..... Kyphosis.....
Lower extremity deformity: Flat-footedness..... Genu varum.....
Genu valgum.....

Questionnaire injury report form

Please answer the following questions on five (5) different injuries (A, B, C, D, E).

How many injuries have you suffered until now as an amateur soccer player?

Number of injuries: (A, B, C, D, E)

Injury location:

1. Head
2. Fingers
3. Wrist/metatarsals
4. Upper arm
5. Elbow
6. Leg
7. Shoulder
8. Spine
9. Lower extremity
10. Ankle
11. Tibia
12. Knee
13. Thigh
14. Hip region-Buttocks
15. Other

Injury site:

L = Left, R = Right

Injury type:

1. Fracture
2. Sprain
3. Strain
4. Dislocation
5. Tendon
6. Other

Kind of injury:

1. Acute, 2. Overuse

Injury mechanism:

1. Cutting, 2. Tackling, 3. Sprinting, Passing, 4. Pushing, 5. Other

Occurred:

1. Preseason preparation, 2. During practice, 3. During games

Kind of therapy:

1. Medicine, 2. Physiotherapy, 3. Plaster cast, 4. Surgery, 5. Nothing

Time absent from practice (number):

Days =..... Weeks =..... Months =.....

Time absent from games (number):

Days =..... Weeks =..... Months =.....

Time after the injury in which you played without distress (number):

Days =..... Weeks =..... Months =.....

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