

THE INCIDENCE OF KNEE STRAINS IN ATHLETES

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REZUMAT

Obiectiv: Studiul de față dorește să realizeze o analiză a incidenței traumatismelor de genunchi apărute la sportivii de performanță. **Material și metode:** În perioada 2000-2004 au fost analizate un număr de 114 cazuri de entorsă de genunchi, care au fost în evidența Policlinicii pentru Sportivi din Timișoara. **Rezultate:** Raportul bărbați/femei a fost de 4,70, iar incidența maximă, de 64,90%, între 21-30 ani. În lotul studiat cele mai frecvente leziuni au fost cele ligamentare - 58,76% (67 cazuri), urmate de cele de menisc - 41,22% (47 cazuri). **Discuții și concluzii:** S-a constatat o rată crescută a recidivelor, explicate prin nerespectarea programului de recuperare, reînceperea antrenamentelor și a competițiilor înainte de vindecarea completă. Entorsa de la nivelul genunchiului reprezintă principala cauză de inactivitate la sportivi. Cel mai frecvent acest tip de leziune este întâlnită la sporturile de contact (fotbal, baschet, handbal, rugby) și mai puțin în sporturile individuale. La această frecvență contribuie suprafața de joc, gradul de pregătire fizică, nerespectarea regimului alimentar și a medicației de efort și de refacere.

Cuvinte cheie: menisc, traumatisme sportive, atleți

ABSTRACT

Objective: This study is an analysis of the incidence of athlete's knee injuries. **Material and methods:** During 2000-2004, 114 cases of knee strains were recorded at the Sports Clinic from Timisoara. **Results:** The ratio men/women was 4.70 and the maximum incidence (64.90%) was between 21-30 years. In the study group, the most frequent injuries were those affecting the ligaments, 58.76% (67 cases), followed by injuries of the meniscus, 41.22% (47 cases). **Discussions and conclusions:** This study demonstrates that the ratio of relapses has increased due to the failure of the recovery program follow-up and the restart/resumption of trainings and competitions, before complete healing. Knee strain is the main cause of inactivity at athletes. This type of injury occurs more frequently in team sports (eg., football, basketball, handball, rugby) than in individual sports. The frequency is also influenced by the field surface, physical state, the non-compliance to diet and medication.

Key Words: meniscus, sports injury, athletes

INTRODUCTION

Knee strain occurs frequently to athletes. The maximum incidence occur in team games because of the sudden movements, stops, torsions and repeated jumps; the lowest incidence is encountered in individual sports, where injuries appear due to a faulty training.

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The injury occurs due to an indirect torsion of the ligaments produced either through a forced move or through an abnormal move.

THE MECHANISM OF ACTION

The most frequent mechanism is the indirect one: forced moves in valgum or varum hyperextension or hyperflexion, torsion or a combination of all these. The direct mechanism is less frequent and usually occurs in rugby.

Strain accidents on sports grounds (especially in football, rugby, handball, basketball and volleyball) happen because of a combination of:

- Abduction, flexion and external torsion of the shank. In this way the internal capsulo-ligamental

structures are tensed and when broken lead to an external hypertorsion that stretches the anterior cruciate ligament and can tire it.

- Adduction, flexion and internal torsion that breaks the external collateral ligament, sometimes associated with the injury of the anterior cruciate ligament.

The most frequent moves that may cause knee strains are:¹⁻³

Forced valgus move – when the force goes on the external surface of the knee, the leg and the hip are fixed. Usually, in this situation tibial superior articular surface is fractured, the middle collateral ligament is injured, associated or not with the injury of internal meniscus or with anterior cruciate ligament. This mechanism is frequently encountered in rugby players.

Forced varus move – less frequent because the medial surface of the knee is better protected, It determines fractures of the lateral condylar cavity or injuries of the external collateral ligament (lateral).

The sudden extension after a forced flexion – determinates meniscus injuries, posterior capsule injuries, associated or not with injuries of the cruciate ligaments. Frequently found in football players.

Torsioned knee move – produced through the body torsion with the leg blocked is associated sometimes with forced valgus and leads to multiple injuries of medial collateral ligament, anterior cruciate ligament and internal meniscus. All these injuries are known as the O'Donoghue triad. The sports where these injuries are encountered are football, handball, basketball, and skiing.

Vertical settling – produced through a vertical shock, may be associated with a varus or valgus and determines injuries of the bones, ligaments or meniscus. Frequently found in sports with vertical jumps: volleyball, skating, basketball.

Direct impact on the anterior surface of the knee – produces hematoma, bursitis or patella fractures. It is found in football and skating.

Predisposing factors which may facilitate the occurrence of strains are the following: congenital malformation, various gained deformities modifying the normal direction of the joint (posttraumatic articular laxity, muscular atrophy), the preexistence of a degenerative rheumatic process, fatigue, faulty exercises, faulty technical state of the equipment, sports grounds and sports bases, technical deficiencies concerning the sport practiced, indiscipline, imprudence, negligence, unfavorable meteorological factors (ice, frozen snow).⁴

MATERIAL AND METHODS

This study was performed at the Sports Clinic from Timisoara during a 4-year period (2000-2004). One hundred and fourteen cases of knee strains were registered. From these 33 were relapses (28.94%). (Table 1)

Table 1. Distribution of cases by year.

Year	No. of consultations	No. of strains	Relapses
2000	410	23	7
2001	375	21	8
2002	412	19	4
2003	442	27	9
2004	447	24	5
Total	2086	114	33

The main symptoms of knee strains discovered in our study are: pain installed immediately after the accident exacerbated by moves and walk, local tumefaction, moderated hydrarthrosis, rarely limited bruises; examination of the moves of ligament laxity causes pain, in 20-30° flexion the laxity can be of 5°.^{5,6}

RESULTS

Distribution of cases depending on sport branches

The frequency of accidents is lower in individual sports and much higher in team sports, because of the numerous physical contacts and of sudden change of moves. (Table 2)

Table 2. Distribution of cases depending on sport branches.

Sport	No. of strains	Percentage from all the strains
Football	31	27.19%
Handball	13	11.40%
Different sports	10	8.77%
Basketball	8	7.01%
Rugby	7	6.14%
Badminton	7	6.14%
Skiing	6	5.26%
Gymnastics	6	5.26%
Athletics	5	4.38%
Boxing	5	4.38%
Tennis	5	4.38%
Volleyball	4	3.50%
Sailing	4	3.50%
Swimming	3	2.63%

The distribution on age groups

The frequency of accidents was higher in those athletes that have started practicing sports from childhood and in time, they have developed joint problems because of long-time effort, sports grounds unfit for technical conditions required, overtax in competition periods, most frequently the lack of adequate medication and diet required for that type of effort.^{7,8} (Figure 1)

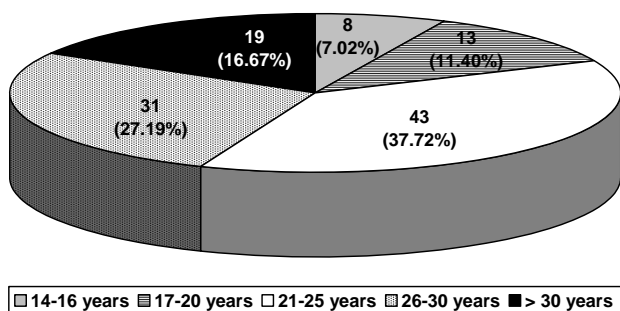


Figure 1. The distribution on age groups.

The gender distribution was as follows: females 20 cases (17.54%), males 94 cases (82.45%), with a male to female ratio of 4.70.

The distribution of cases according to the type of injury is shown in Figure 2.

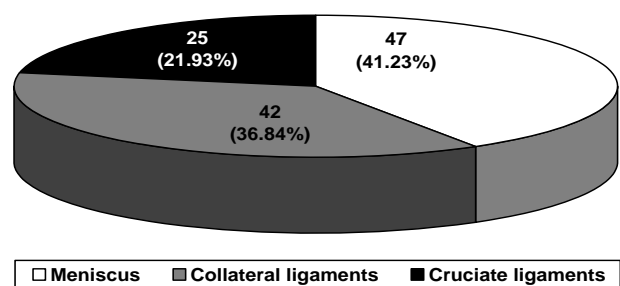


Figure 2. The distribution by type of injury.

Meniscus injuries

From the total of 114 cases of strain injuries, meniscus injuries are most frequent, 47 cases (41.22%), from which 9 cases were relapses (19.14%).

There were 34 cases with internal meniscus injuries, 72.34% from all cases of meniscus injuries and 29.82% from all types of strains. Six cases of relapse were found (17.64% from 34 cases with internal meniscus injuries; 12.76% from 47 meniscus injuries; 5.26% from 114 strains). There were 13 athletes with external meniscus injuries (27.65% from 47 meniscus injuries and 11.40% from 114 strains), three of them were relapses (23.07% from those 13 athletes with external meniscus injuries; 6.38% from 47 cases with meniscus injuries; 2.63% from 114 strain cases).

Ligaments injuries

From 114 strain cases, 67 (58.77%) had ligament injuries from which 24 (21.05%) were relapses. In this subgroup 43 patients had collateral ligaments injuries and 24 had cruciate ligaments injuries.

Collateral ligaments: 43 cases (64.17% from 67 ligament injuries and 37.71% from 114 strains):

- Internal collateral ligament - 29 cases:
 - 67.44% from 43 collateral ligaments injuries;
 - 43.28% from 67 strains with ligament injuries;
 - 25.43% from 114 strains.
 - 7 relapses:
 - 24.13% from internal collateral ligament injuries;
 - 16.27% from collateral ligament injuries;
 - 10.44% from ligament injuries;
 - 6.14% from strains;
- External collateral ligament - 24 cases:
 - 55.81% from 43 cases with strains associated with collateral injuries;
 - 35.82% from 67 strains with ligament injuries;
 - 21.05% from 114 strains.
 - 3 relapses:
 - 12.50% from external collateral injuries;
 - 6.97% from collateral ligament injuries;
 - 4.47% from ligament injuries;
 - 2.63% from strains;

Cruciate ligaments: 24 cases (35.82% from 67 ligament injuries and 21.05% from 114 strains):

- Anterior crossed ligament - 19 cases:
 - 79.16% from 24 strains with cruciate ligament injuries;
 - 28.35% from 67 ligament injuries;
 - 16.66% from 114 strains;
 - 11 relapses:
 - 57.89% from anterior cruciate ligaments;
 - 45.83% from cruciate ligament injuries;
 - 16.41% from ligament injuries;
 - 9.64% from strains.
- Posterior crossed ligament - 5 cases:
 - 20.83% from 24 cruciate ligament injuries;
 - 7.46% from 67 ligament injuries;
 - 4.38% from 114 strains;
 - 3 relapses:
 - 60% from posterior ligament injuries ;
 - 12.50% from cruciate ligament injuries;
 - 4.47% from ligament injuries;
 - 2.63% from strains.

DISCUSSIONS

Trauma of the knee represents one of the most important chapters in sports injuries, because they

influence athlete's performance and the period of inactivity after the trauma/ injury.

From this study results that knee strains are frequently found in team sports (football 27.19%, handball 11.40%, basketball 7.01%) compared with individual sports (gymnastics 5.26%, badminton 6.14%, lawn tennis 4.38%), findings similar with other publications.

Price performed a study on knee injuries at 38 football academies from Great Britain and concluded that 31% of the injuries suffered by athletes are strains.⁹ The most frequently involved sports were those with sudden moves. A higher incidence of strains is found in athletes aged between 21-25, because of the overtax and mostly in those who started professional sports since childhood, because of the long-duration physical effort made since an early age, without respecting a diet and the medication of effort for their age. Hall S. claims that the producing mechanism in those injuries may have multiple underlying factors. He thinks that the insufficient development of muscles in teenagers makes them vulnerable to the inherent shocks during sport activities and add to the technical condition in athlete's physical training.²

La Forgia confirmed the fact that the number of knee strains is higher in those athletes who restart their sports activities (June, July, August-January, February) after a period of inactivity, because of the physiological and metabolic changes.¹⁰ All these elements explain the high frequency of relapses in athletes, 28.94%, a higher percentage than the one mentioned in specialized literature, 17%. This gap may be caused by a inaccurate diagnosis or an inadequate medical treatment. That is why sports clubs are suggested to adapt physical training programs for different age groups. Athletes are suggested to consult the physicians from the sport clinics to prescribe a certain diet according to their age and effort and to reduce the frequency of accidents.

The most frequently indicated treatment is: orthopedic treatment with immobilization in cruropodal casts for 20-30 days, medical treatment with anti-inflammatory agents (Nifluril[®], Profenid[®], Tratul[®], Diclofenac duo[®], Ketorol[®], Tilocotil[®], Ibuprofen[®]) muscle relaxants (Mydocalm[®], Clorzoxazon[®]), analgetics (Algocalmin[®], Analgin[®], Piafen[®]). During the entire immobilization period isometric contractions were recommended, while after the immobilization functional recovery treatment was recommended. Surgery was performed where necessary.¹¹⁻¹³

CONCLUSIONS

All sports fields should take accidents prevention measures such as: adequate equipment, adequate physical and technical preparation, sports grounds in very good conditions, discipline and a level of educational at athletes, the athletes diet must be according to the effort, a good medication for effort.

In case of sports accidents, the athletes are examined by specialized physicians, who prescribe the treatment according to the severity of injury (partial rest, if necessary, immobilization, physiotherapy, ionization, diadynamics, cold, ultrasounds, local and general anti-inflammatory medication, painkillers, muscle relaxing medication) or they send the athlete to orthopedists who prescribes therapeutic treatment. No matter how serious the injury is, the sport team doctor and the coach should oversee that the athletes respect therapeutic and recovery indications to prevent relapses. Many of the relapses are due to the athlete non-observance of the specialist indications and the non-achievement of the indicated treatment, especially kinetic recovery treatment.

The incidence of relapses may be reduced by the observance of the inactivity period and the medical and kinetic treatment. It is necessary to gradually and slowly restart the effort under strict surveillance of the sports medicine doctors.

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