

# The study of musculoskeletal injuries in athletes from Târgu Mureș

## Studiu privind traumatismele osteoarticulare la sportivi din Târgu Mureș

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### Abstract

*Background.* Although exercising is beneficial to the human body, it can also have a negative impact on the quality of life. Traumatic injuries and osteoarticular overstraining in a sportsman can be the most important negative effects of sports.

*Aims.* This study aims to describe osteoarticular traumas, recovery techniques and time needed to achieve athletic fitness.

*Methods.* We conducted a retrospective observational clinical study in a group of 29 sportsmen. They completed an eight-item questionnaire and the obtained data were processed by the aid of the SPSS20 software program.

*Results.* The most affected anatomical regions were the joints: the knee in 62.1%, followed by the elbow in 17.3% and the ankle in 13.8%. 17 (58.7%) sportsmen suffered from sprain type injuries, 7 (24.1%) from joint dislocation, 4 (13.8%) were diagnosed with fractures, and one (3.4%) with muscle strain. The average recovery time of the studied group following injury was 12.83 weeks, thus for footballers 13.07 weeks and for volleyball players 12.57 weeks. The recorded values of  $t_{value}$  for all items were superior to  $t_{critical}$  for  $p < 0.05$ , and the differences of the obtained results were statistically significant, which contributes to the rejection of the null hypothesis. The r-Pearson index was 0.808, highlighting a strong correlation between age and the duration of exercising. Correlation was good and statistically significant between the duration of recovery and regaining full fitness;  $r = 0.556$  and  $p_{correlation} = 0.002$  for  $p < 0.01$ .

*Conclusions.* Musculoskeletal injuries are common in athletes from Târgu Mureș and are frequently located at the level of the knee, ankle and elbow joints. Medical rehabilitation outlines a good therapeutic conduct, thus contributing to the regaining of full fitness in a relatively short time.

**Keywords:** sport, musculoskeletal trauma, medical rehabilitation, full fitness.

### Rezumat

*Premize.* Pe lângă beneficiile aduse organismului, sportul poate avea un impact negativ asupra calității vieții. Principalul efect negativ al sportului este reprezentat de traumatisme și suprasolicitățile osteoarticulare la care este supus sportivul.

*Obiective.* Studiul își propune descrierea traumatismelor osteoarticulare, metodologia de recuperare precum și timpul necesar ajungerii la forma sportivă.

*Metode.* Am efectuat un studiu clinic, observațional, retrospectiv, pe un lot de 29 de sportivi. Aceștia au completat un chestionar cu 8 itemi, iar datele obținute au fost prelucrate în programul SPSS20.

*Rezultate.* Cea mai afectată regiune anatomică a fost articulația genunchiului 62,1%, urmată de articulația cotului 17,3% și glezna 13,8%. La 17 (58,7%) dintre subiecți, traumatismul a fost de tip entorsă, 7 (24,1%) au suferit luxații, 4 (13,8%) au fost diagnosticați cu fracturi și 1 (3,4%) cu întindere musculară. Durata repausului a eșantionului după accidentare a fost de 12,83 săptămâni, astfel pentru grupa de fotbal 13,07 săptămâni, iar pentru cea de volei 12,57 săptămâni. Valorile înregistrate de  $t_{value}$  pentru toți itemii, sunt superioare  $t_{critical}$ , pentru  $p < 0.05$ , iar  $p_{value}$  evidențiază o semnificație puternică a rezultatelor, ceea ce contribuie la respingerea ipotezei nule. Indicele r-Pearson a fost 0,808, evidențiind o corelație puternică între vârstă și durata practicării. Corelația a fost bună și semnificativ statistică între durata recuperării și durata reintrării în formă sportivă,  $r$  fiind 0,556, iar  $p_{correlation} = 0,002$  pentru  $p < 0,01$ .

*Concluzii.* Traumatismele osteoarticulare sunt frecvente la sportivii din Târgu Mureș și se localizează frecvent la nivelul articulației genunchiului, gleznei și cotului. Recuperarea medicală determină o conduită terapeutică bună, contribuind la intrarea în forma sportivă într-un interval de timp relativ scurt.

**Cuvinte cheie:** sport, traumatisme osteoarticulare, recuperare medicală, formă sportivă.

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## Introduction

Besides its benefits in maintaining a healthy body, sports can have a negative impact on the quality of life. Athletes often have to cope with competition anxiety, poor teamwork, psychological and physical stress. The main negative effects of sports undergone by athletes are by far trauma and overstrain of the osteoarticular system. These injuries of the body affect the athletes' quality of life by inducing emotional and physical disabilities ranging from diminished physical performance to permanent abandonment of sports activities (Garrick & Requa 2003; Wiese-Bjornstal, 2010; Deroche et al., 2012; Schwab Rees et al., 2012). Sport rehabilitation is a delicate issue that must be continuously improved through interdisciplinary collaboration (Walker et al., 2007).

Musculoskeletal injuries are common in athletes. They adversely affect subsequent sport and physical activities. An effective medical recovery plan applied by a multidisciplinary team under the tutelage of a sports medicine physician can have a positive influence on recovery activities and on the quality of life of athletes who have suffered musculoskeletal traumas (Monticone et al., 2014).

A very important aspect of sport rehabilitation is to identify risk factors that lead to injury. Tyler et al. (2014) show that the identification of risk factors is essential especially in case of pelvic trauma and lower limb injuries. These factors can have a somatic or psychic origin or can be external factors such as playing conditions or the quality of training. The medical education of athletes, which is an essential issue, has received more and more attention lately. This has a role in prevention, recovery management, as well as in the athletes' quality of life regarding sport activities and social behavior following musculoskeletal trauma (Diamond & Solomon, 2014).

Sports practice shows a rising trend, which inevitably leads to an increasing number of sport accidents and implicitly, to high economic costs. Reducing these costs gives rise to the need to implement prevention strategies achieved through health education carried out by a multidisciplinary team (Öztürk & Kılıç, 2013).

There are numerous studies on the incidence of sport traumas, which help in raising the athletes' awareness about the importance of training and the process of sport recovery and in particular, about the risks athletes are exposed to according to the specificity of the sport they practice. Thus, a study conducted in athletes of the Great Britain's Olympic team shows that 27 (39%) suffered from various injuries during the Winter Olympic Games, in 2014, and the most frequent location of injuries was represented by the lower extremities (Palmer-Green & Elliott, 2015).

Harvey Kelly et al. (2014), in a study performed in 80 patients with preexisting osteoarticular trauma, found a significant decrease in the frequency of sports practice and a diminished performance. This decrease was predominantly observed in those who suffered any trauma at the level of the lower extremity.

Volleyball players frequently suffer from patellar tendinopathy. De Vries et al. (2014) find this condition in 13% of athletes such as volleyball and basketball players.

According to Barber Foss et al. (2014), volleyball is the second sport in generating traumas in females. It is known that the incidence of injuries in volleyball players is directly related to the male gender, the duration of training and the degree of participation in competitions. Bahr & Bahr (2014) observed a correlation between these factors and the frequency of jumps during both training and competition; young males jump more often than young females (62.2 jumps/h for boys and 41.9 jumps/h for girls).

A long-term negative effect of volleyball is represented by glenohumeral internal rotation deficit. Interestingly, this issue in women is strictly linked to the performance level, while in men this is related to the dominant arm and the presence of a history of trauma at this level (Hadzic et al., 2014).

## Objectives

This study aims to determine the incidence of osteoarticular traumas and the methodology for recovery in athletes from Târgu Mureş. We also aimed to identify those sports that frequently expose athletes to trauma, the anatomical regions exposed to injuries and the type of osteoarticular traumas.

## Hypothesis

During this study, we started from the hypothesis that by applying a specific methodology for osteoarticular traumas in our athletes, recovery can be optimized.

## Material and methods

This research was conducted with the approval of the Ethics Committee of the University of Medicine and Pharmacy, Târgu Mureş. All subjects included in the study were informed about the purpose of this research and the methods of dissemination; subsequently, the whole group agreed to participate in the study and gave their informal consent for the publication of the obtained data.

### *Research protocol*

#### *a) Period and place of the research*

The study was carried out in the period 1 October - 1 November 2014 in the sports clubs and sports associations of Târgu Mureş and in the University Sports Club of the University of Medicine and Pharmacy, Târgu Mureş.

#### *b) Subjects and groups*

We conducted a retrospective observational clinical trial in a group of 29 athletes, age  $\pm$  SD =  $20 \pm 3.981$ , of which 15 male football players (N), age  $\pm$  SD =  $2.093 \pm 3.812$ , and 14 female volleyball players (N), age  $\pm$  SD =  $18.71 \pm 3.9625$ . All study subjects are involved in junior and senior competitions.

#### *c) Tests applied*

In the framework of this study, we applied a non-standardized questionnaire comprising 10 items and two questions for identifying personal data: gender and age. The questionnaire was applied individually, and the responses were included in tables in order to be statistically processed for both the entire sample and for the two groups of sports: football and volleyball.

Name of the questionnaire – The quality of life of athletes from Targu Mureş following osteoarticular strain

or injuries. The questionnaire comprised the following items:

1. Practiced sport/sports - type and duration
2. Have you suffered any bone or joint injuries while practicing a sport? Specify the injured part of the body
3. Specify the medical diagnosis
4. Have you undergone medical rehabilitation after the accident?
5. How long did you have to stop practicing sports after the accident?
6. Do you think that this accident has negatively influenced your sports career?
7. How often do you experience pain in the injured body part while resting?
8. How long after the accident did you have to stop exercising?

*d) Statistical processing*

The study used the method of the survey based on a non-standardized questionnaire developed by us according to the aimed objectives and on the statistical-mathematical method for processing data and highlighting relevant aspects. The obtained data were statistically processed with the IBM SPSS Statistics 20 software for Windows, which was designed to calculate the following statistical indicators: arithmetic mean, standard deviation (SD), Student t test (t), threshold of significance ( $p_{value}$ ), Pearson's correlation coefficient (r), significance threshold of the correlation value  $r(p_{correlation})$ . For this study, the significance threshold of  $p < 0.05$  was considered relevant.

**Results**

Item 1. *Practiced sport/sports - type and duration* (Tables I, II, III).

**Table I**

The percentage of subjects according to the practiced sport.

Statistical indicators	N	Football		Volleyball	
		N	%	N	%
Sample	29	15	51.7	14	48.3

**Table II**

Duration of practice.

Statistical indicators	N	Mean	SD	t	p
Sample	29	10.17	4.80	11.404	.000

**Table III**

Descriptive statistics according to the different groups of sports.

Group	N	Mean	SD
Football	15	12.13	5.527
Volleyball	14	8.0714	2.75860

Item 2. *Have you suffered any bone or joint injuries while practicing a sport? Specify the injured part of the body* (Table IV).

Item 3. *Specify the medical diagnosis* (Table V).

Item 4. *Have you undergone medical rehabilitation after the accident? For how long?* (Tables VI, VII).

**Table VI**

Number of weeks of recovery after the accident.

Statistical indicators	N	Mean	SD	t	p
Sample	29	4.52	6.84	3.555	.001

**Table VII**

Descriptive statistics according to the sports groups.

Group	N	Mean	SD
Football	15	4.00	3.873
Volleyball	14	5.0714	9.16905

Item 5. *How long did you have to stop practicing sports after the accident? (weeks of rest)* (Tables VIII, IX).

**Table VIII**

Duration of rest after the accident.

Statistical indicators	N	Mean	SD	t	p
Sample	29	12.83	13.45	5.135	.000

**Table IX**

Descriptive statistics according to the sports groups.

Group	N	Mean	SD
Football	15	13.07	14.538
Volleyball	14	12.5714	12.73224

Item 6. *Do you think that this accident has negatively influenced your sports career?* (Table X).

**Table IV**

The number of sports injuries and the traumatized region.

Group	Elbow		Knee		Ankle		Metatarsals		Thigh		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Football	4	28.6	8	57.2	1	7.1	1	7.1	-	0	14	48.3
Volleyball	1	6.7	10	66.6	3	20	-	0	1	6.7	15	51.7
Sample	5	17.3	18	62.1	4	13.8	1	3.4	1	3.4	29	100

**Table V**

The results of the medical diagnosis.

Group	Fractures		Sprain type injuries		Joint dislocation		Muscle tear		Total	
	N	%	N	%	N	%	N	%	N	%
Football	2	14.3	8	57.2	4	28.5	-	0	14	48.3
Volleyball	2	13.3	9	60	3	20	1	6.7	15	51.7
Sample	4	13.8	17	58.7	7	24.1	1	3.4	29	100

**Table X**  
The percentage of the negative influence of accidents on sports career.

Group	Yes		No		Total	
	N	%	N	%	N	%
Football	5	33.3	10	66.7	15	51.7
Volleyball	6	42.9	8	57.1	14	48.3
Sample	11	37.9	18	62.1	29	100

Item 7. How often do you experience pain in the injured body part while resting? (Table XI)

**Table XI**  
The percentage of aches and pains in the body parts that were injured while resting.

Group	Yes		No		Total	
	N	%	N	%	N	%
Football	4	26.7	11	73.3	15	51.7
Volleyball	7	50	7	50	14	48.3
Sample	11	37.9	18	62.1	29	100

Item 8. How long after the accident did you have to stop exercising? (Tables XII, XIII)

**Table XII**  
Duration of regaining full fitness.

Statistical indicators	N	Mean	SD	t	p
Sample	29	22.21	15.027	7.958	.000

**Table XIII**  
Descriptive statistics according to the sports groups.

Group	N	Mean	SD
Football	15	27.47	16.826
Volleyball	14	16.5714	10.73968

**Table XIV**  
Correlation between age and the duration of sports practice.

Groups	r	p
Pair 1 Age – duration of practice	.808**	.000

\*\*Correlation is significant at the 0.01 level (2-tailed)

**Table XV**  
Correlation between the duration of treatment and the duration of recovery.

Groups	r	p
Pair 1 Duration of treatment - duration of recovery	.273	.152

**Table XVI**  
Correlation between the duration of recovery and the duration of regaining full fitness.

Groups	r	p
Pair 1 Duration of recovery – duration of regaining full fitness	.556**	.002

\*\*Correlation is significant at the 0.01 level (2-tailed)

## Discussions

In our study, of all 29 investigated athletes, 51.7% were footballers and 48.3% volleyball players. The duration of sports practice  $\pm$  SD of the sample was  $10.17 \pm 4.80$ , in the case of footballers  $12.13 \pm 5.52$  years and in case of

volleyball players  $8.07 \pm 2.75$  years. The most affected anatomical region was the knee 62.1%, followed by the elbow 17.3%, and the ankle 13.8%. In the group of football players, the proportion of the injured areas was 57.2% in the knee joint and 28.6% in the elbow joint, and in the case of volleyball players, the major traumas were localized in the knee 66.7% and in the ankle 20%.

17 (58.7%) of the surveyed subjects suffered from sprain type injuries, 7 (24.1%) from joint dislocations, 4 (13.8%) from fractures, and 1 (3.4%) from muscular strain.

Regarding the duration of recovery, the group of footballers needed 4 weeks to recover, the group of volleyball players 5 weeks, and the average recovery time of the sample was 4.52 weeks.

The duration of rest after injury was 12.83 weeks in the sample, thus in the group of footballers 13.07 weeks and in the group of volleyball players 12.57 weeks.

Regarding the assessment of the influence of accidents on their sports careers, the group of footballers declared in a proportion of 66.7% and the group of volleyball players in 57.1% that these did not have a negative effect on their professional development in sports.

The sample group needed on average 22.21 weeks to regain full fitness.

The recorded values of  $t_{value}$  were superior for all items to  $t_{critical}$ ,  $p < 0.05$ , and  $p_{value}$  highlights a high significance of the obtained results, which contributes to the rejection of the null hypothesis and confirms the research hypothesis. The r-Pearson correlation value (calculated in Table XIV) was 0.808, which suggests a strong correlation between age and the duration of practice,  $p < 0.01$ . In the case of the correlation between the duration of treatment and the duration of recovery,  $r=0.273$ , which reflects a relatively good correlation, but the differences were not statistically significant (see Table XV).

The correlation between the duration of recovery and the duration of regaining full fitness was good and statistically significant,  $r$  is 0.556 and  $p = 0.002$  for  $p < 0.01$  (Table XVI).

## Conclusions

1. The current study reveals that the incidence of osteoarticular traumas is higher in the second decade of life, and their frequency affects more females than males.

2. In our study, the most common type of injury is sprain, especially at the level of the knee joint, with a higher incidence among volleyball players compared to footballers.

3. This research highlights the fact that most athletes undergo good quality medical rehabilitation, taking on average 22 weeks to reach the desired fitness to practice sports again.

## Conflicts of interests

There were no conflicts of interests.

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