

Musculo - skeletal trauma incidence in competitive sportsmen: Forearm and elbow traumas by age groups and time spent in sports practising (part II)

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Abstract. The aim of this study was to evaluation of trauma incidence in the sportsmen studied in 2006-2008 through the identification of the risk factors and the introduction of prevention exercises and stretching methods in the training process, during both warm-up and post-effort rehabilitation, in order to prevent (forearm and elbow) injuries and increase performance in competitive sportsmen. *Results.* 2006 – 2008: significantly more elbow lesions in the 13-18 age group than in the 19-22 group ($p = 0.011$, $\alpha = 0.05$); 2008 – 2009: significantly less elbow lesions in the 19-22 age group than in the 27-30 group ($p = 0.014$, $\alpha = 0.05$). No significant differences ($p = 0.587$, $\alpha = 0.05$) in elbow injuries distributed by age groups were recorded between the two periods (August 2006 – July 2008 and August 2008 - July 2009). As the differences in forearm traumas by age groups are minor ($p=0.128$, $\alpha=0.05$), no comparisons of lesions by age groups are necessary. The comparisons between the longevity in sports practicing groups in the first and second period were made with the χ^2 test; the result was $p = 0.48$ with $\alpha=0.05$ significance threshold, which means that in the two periods there are no major differences in forearm and elbow injuries between the longevity groups.

Key words: traumas, forearm, elbow, competitive sportsmen

Introduction

The study batch included 155 sportsmen (52 (33.5%) female and 103 (66.5%) male) who practised athletics (sprint and hurdles), basketball, handball, football and volleyball in Leagues A1 and A2, in Timisoara and Lugoj, Romania. The sportsmen were between 13 and 42 years old and had been practising sports for 4-20 years. The study monitored specific trauma incidence, frequency and location, as well as the causes that led to traumas (1-3). It covered three competition years (August 2006 – July 2009) during which the sportsmen were closely monitored.

The aims of this research were:

- to determine musculo-skeletal trauma incidence, frequency and location by the affected segment in the studied sportsmen;
- to identify and reduce the internal and external factors that cause traumas in sportsmen;
- to develop and implement prevention exercises(4,5);

- to detect musculo-skeletal traumas early, using modern investigation methods: musculo-skeletal ultrasound scan, MRI, CT.

Material and Method

This article contains only part of the results that were recorded and interpreted after studying players of the volleyball, basketball, handball and football teams and athletes of Timisoara and Lugoj. The sportsmen were between 13 and 42 years of age and their longevity in sports practising was between 4 and 20 years. The study extended over a three-year period of competitions, during which the sportsmen were examined closely: August 2006 - July 2009. All injured segments ($N = 11$) were compared against the total number of traumas per sportsmen, age groups and time spent in training, in order to reveal the age groups and longevity groups with the highest trauma incidence(6,7,8) and the most frequently affected segments in the two periods (before and after starting the prevention exercises programme).

Results

Muscle-skeletal distribution by the affected segment and the maximum number of traumas (1-5 traumas suffered by one sportsman in one segment), against the whole batch (N = 155) in the two studied periods.

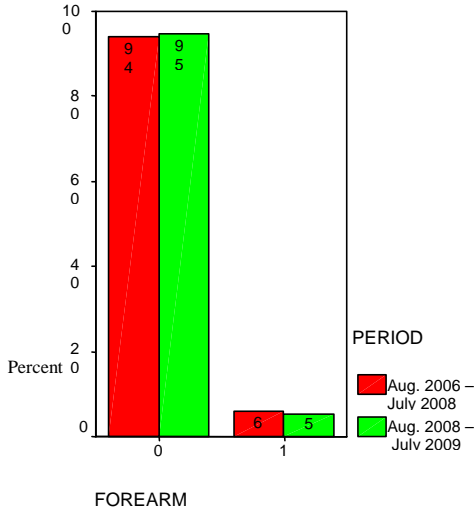


Figure 1. Forearm trauma distribution (%) (0-1 traumas) in the two periods of time

Forearm trauma distribution (figure 1):

- period 1: 9 sportsmen (5.81%) suffered 1 forearm trauma in August 2006 – July 2008;
- period 2: 8 sportsmen (5.16%) suffered 1 forearm trauma in Aug. 2008 – July 2009.

There are no major differences in the number of traumas and injured sportsmen between the two periods.

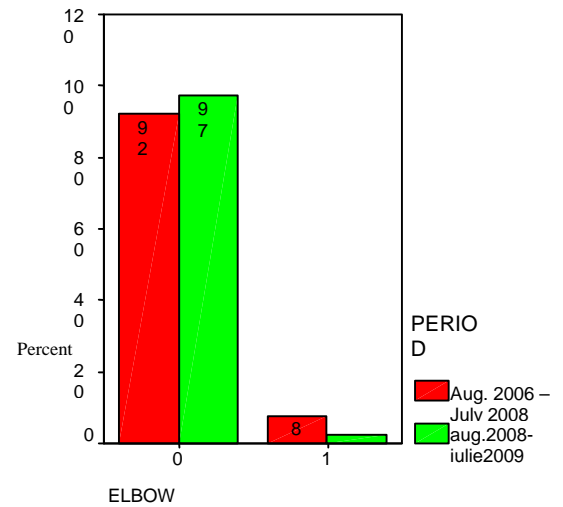


Figure 2. Elbow trauma distribution (%) (0=0 traumas, 1 = 1 trauma) in the two periods of time

Interpretation of elbow trauma distribution (figure 2):

- period 1: 12 sportsmen (8%) suffered 1 trauma in August 2006 – July 2008;
- period 2: 4 sportsmen (3%) suffered 1 forearm trauma in Aug. 2008 – July 2009.

The number of sportsmen who suffered elbow traumas decreased to 8 (5%) in the second period.

Comparisons on age groups and affected segments

Percentage distribution of musculo-skeletal traumas by affected segments and age groups against the whole batch, irrespective of sex or sport; a comparison of the two studied periods.

PERIOD	ELBOW			Total no of sportsmen
	Age group	Number of traumas	% Traumas	
August 2006 – July 2008	13-18	7	19.44	36
	19-22	2	2.86	70
	23-26	1	2.94	34
	27-30	2	16.67	12
	> 30	0	0.00	3
			12	7.74
August 2008 – July 2009	13-18	2	5.56	36
	19-22	0	0.00	70
	23-26	0	0.00	34
	27-30	2	16.67	12
	> 30	0	0.00	3
			4	2.58

Table I. Percentage distribution of elbow traumas

As there are significant differences in elbow lesions by age groups, it is necessary to compare the age groups to decide which group has the most important differences.

2006 – 2008: significantly more elbow lesions in the 13-18 age group than in the 19-22 group ($p = 0.011$, $\alpha = 0.05$)

2008 – 2009: significantly less elbow lesions in the 19-22 age group than in the 27-30 group ($p = 0.014$, $\alpha = 0.05$)

No significant differences ($p = 0.587$, $\alpha = 0.05$) in elbow injuries distributed by age groups were recorded between the two periods (August 2006 – July 2008 and August 2008 - July 2009).

Age groups	August 2006 - July 2008	August 2008 – July 2009
13-18	19.44%	5.56%
19-22	2.86	0.00
23-26	2.94	0.00
27-30	16.67	16.67
> 30	0.00	0.00

Table II. Percentage of elbow lesions in the two periods

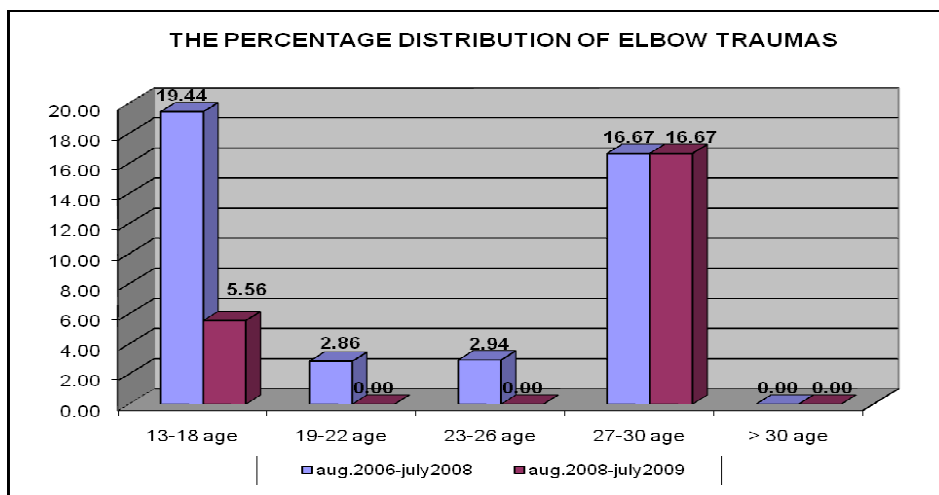


Figure 3. A comparison of the percentage distribution of elbow traumas by age groups in the two periods

PERIOD	FOREARM			Total no of sportsmen
	Age group	Number of traumas	% Traumas	
August 2006 – July 2008	13-18	0	0.00	36
	19-22	6	8.57	70
	23-26	1	2.94	34
	27-30	2	16.67	12
	> 30	0	0.00	3
		9	5.81	155
August 2008 – July 2009	13-18	0	0.00	36
	19-22	5	7.14	70
	23-26	1	2.94	34
	27-30	2	16.67	12
	> 30	0	0.00	3
		8	5.16	155

Table III. Percentage distribution of forearm traumas

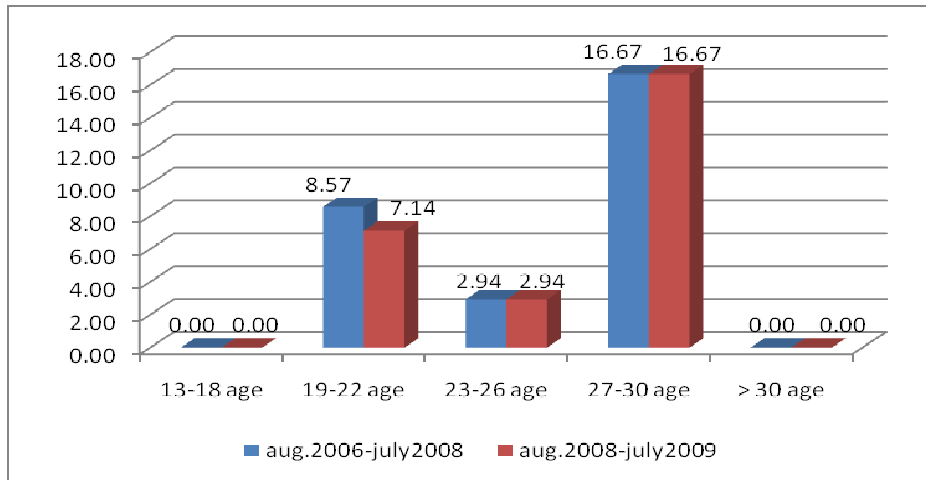


Figure 4. A comparison of the percentage distribution of forearm traumas by age groups in the two periods

As the differences in forearm traumas on age groups are minor ($p = 0.128$, $\alpha = 0.05$), the comparisons of lesions on age groups are not necessary. The table indicates that the decrease in the number of forearm injuries was insignificant in the second period compared with the first.

Comparisons by time spent in sports practising and injured segments

Percentage distribution of musculo-skeletal traumas by affected segments and time spent in sports practising, against the whole batch, irrespective of sex or sport; a comparison of the two studied periods.

PERIOD	FOREARM			Total number of sportsmen
	Time spent in sports practising group	Number of traumas	% Traumas	
August 2006 – July 2008	4-6	0	0	15
	7-10	3	4.41	68
	11-15	6	9.68	62
	16-20	0	0	8
	> 20	0	0	2
	Total	9	5.81	155
August 2008 – July 2009	4-6	0	0	15
	7-10	3	4.41	68
	11-15	5	6.45	62
	16-20	0	0	8
	> 20	0	0	2
	Total	8	4.52	155

Table IV. Percentage distribution of forearm traumas

For the first studied period, the comparisons between the groups of time spent in sports practising were made with the χ^2 test; the results were $p = 0.48$, with a significance threshold $\alpha = 0.05$, which indicates that there were no significant differences between the number of forearm traumas in these groups.

For the second period, the comparisons between the groups of time spent in sports practising were made with the χ^2 test; the results were $p = 0.789$, with a significance threshold $\alpha = 0.05$, which indicates that there were no significant differences between the number of forearm traumas in these groups.

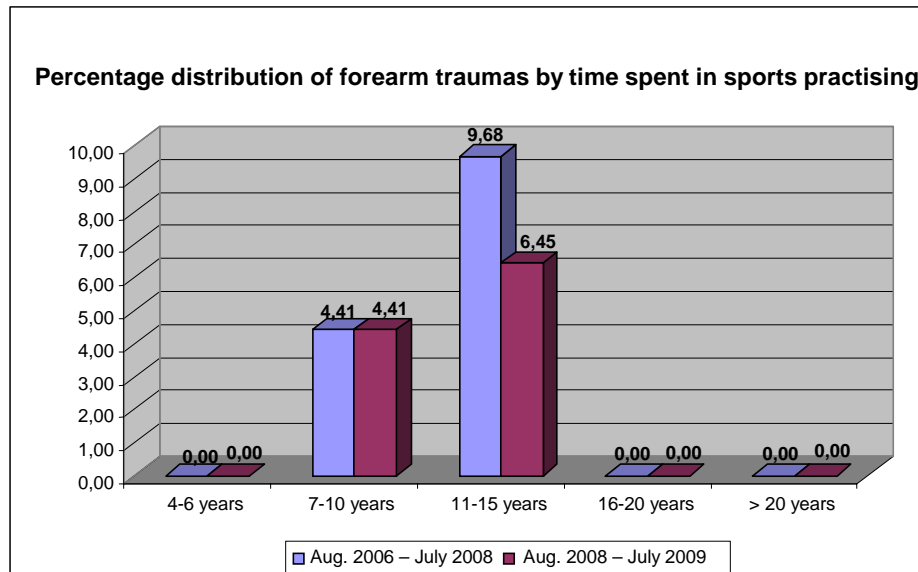


Figure V. Percentage distribution of forearm traumas by time in sports practising

In order to compare the percentage values for each group between the two periods, the Z test was applied and the following results were obtained:

Time spent in sports practising	p value and significance	α significance threshold
4-6 years	0.99 ^{ns}	0.05
7-10 years	0.676 ^{ns}	0.05
11-15 years	0.741 ^{ns}	0.05
16-20 years	0.99 ^{ns}	0.05
> 20 years	0.99 ^{ns}	0.05

Table V. Compare the percentage values forearm for two periods

Interpretation: the decrease in the number of forearm traumas is insignificant or stays the same in the second period, compared to the first.

PERIOD	ELBOW			Total no of sportsmen
	Time spent in sports practising group	Number of traumas	% Traumas	
August 2006 – July 2008	4-6 years	3	20.00	15
	7-10 years	5	7.35	68
	11-15 years	3	4.84	62
	16-20 years	1	12.5	8
	> 20 years	0	0	2
	Total	12	7.74	155
August 2008 – July 2009	4-6 years	1	6.67	15
	7-10 years	1	1.47	68
	11-15 years	1	1.61	62
	16-20 years	1	12.5	8
	> 20 years	0	0	2
	Total	4	2.58	155

Table VI. Percentage distribution of elbow traumas by time spent in sports practising

For the first studied period, the comparisons between the groups of time spent in sports practising were made with the χ^2 test; the results were $p = 0.364$, with a significance threshold $\alpha = 0.05$, which indicates that there were no significant differences between the number of elbow traumas in these groups.

For the second period, the comparisons between the groups of time spent in sports practising were made with the χ^2 test; the results were $p = 0.314$, with a significance threshold $\alpha = 0.05$, which indicates that there were no significant differences between the number of elbow traumas in these groups.

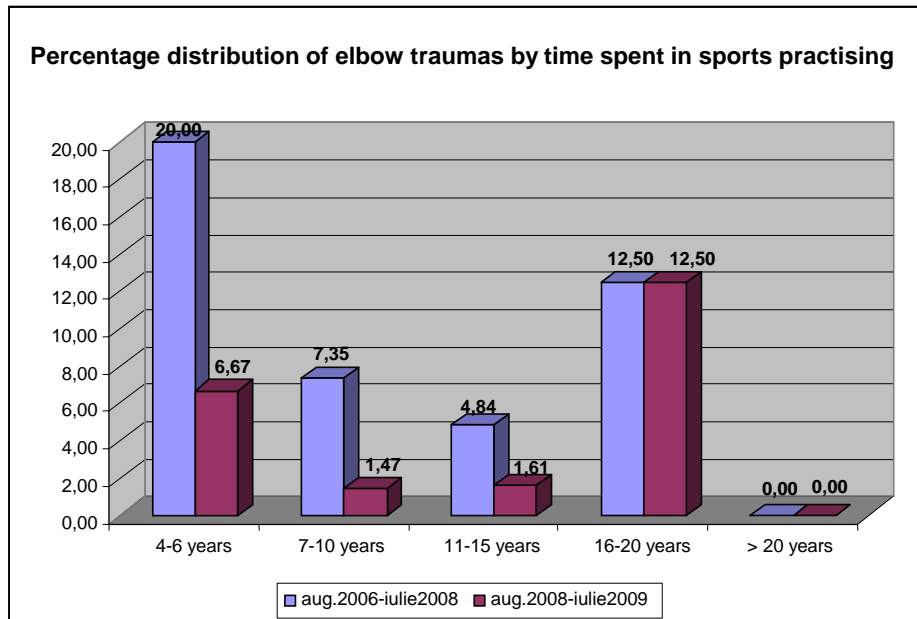


Figure VI. Percentage distribution of elbow traumas by time spent in sports practising

In order to compare the percentage values for each group between the two periods, the Z test was applied and the following results were obtained:

Time spent in sports practising	p value and significance	α significance threshold
4-6 years	0.296 ^{ns}	0.05
7-10 years	0.105 ^{ns}	0.05
11-15 years	0.305 ^{ns}	0.05
16-20 years	0.45 ^{ns}	0.05
> 20 years	0.99 ^{ns}	0.05

Table VII. Compare the percentage values elbow for two periods

Interpretation: the decrease in the number of elbow traumas(9,10) is insignificant or stays the same in the second period, compared to the first.

Conclusions

In the past decade, the incidence of muscular and bone traumas in sportsmen has increased worldwide.

The early detection of the causes and mechanisms of various accidents and the use of effective means to reduce traumas – especially predictable traumas – can be done only through interdisciplinary (11,12) cooperation (between coach/trainer, doctor, kinetic therapy specialist, nutritionist, sportsmen).

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