

Chronic pain in the musculoskeletal system among judo athletes

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Summary

Introduction. Competitive sports entail not only physical effort but often bodily injuries and chronic pain. The aim of this paper was to characterize the types of pain experienced by judo athletes.

Material and methods. The survey covered 75 judo athletes. 33 of them declared that they suffer from chronic pain. The pain was evaluated with the use of the Laitinen pain questionnaire (where pain is characterized according to four categories: intensity, frequency, administration of drugs and limitation of activity). The relation between the data was determined with the use of the Pearson correlation coefficient and the differences were determined using t-distribution test for independent groups adopting $p \leq 0,05$ as the minimum level of significance.

Results. The general pain index was 4.33. No significant differences between the results of different subgroups of athletes were observed. The index of intensity according to the Laitinen scale was the highest (1.73) and the pain intensity index was only slightly lower (1.55). The results in the limitation of activity (0.79) and administration of drugs (0.27) categories were significantly lower ($p < 0.001$).

Conclusions. 1. Chronic pain of the musculoskeletal system was observed in the majority of athletes regardless of their age, skills and the time they have practiced judo. 2. The athletes usually felt the pain in their knees and lower back – the parts of the locomotor system which are under the greatest strain during judo trainings and fights.

Introduction

One of the major negative aspects of competitive sports is excessive strain on the body which often leads to bodily injuries. Over the last years the incidence of sports injuries has increased due to growing physical proficiency. In 1975 in England there were 5% of hospitalized sports injuries. In 1990 the percentage reached 17 and in 2000 it was 23-28%. In Europe 50-60% of sports injuries concern footballers. The most common injuries include: ankle sprains and muscle strains [1-4].

Stretching exercises are very important in the prophylaxis of sports injuries. Another important element is strengthening postural muscles (back muscles, quadriceps, sciatic-tibial muscles) and improving central stabilization and eliminating asymmetry. As an element of prophylaxis, athletes and coaches should be provided with extensive information on the course of action in case of sports injuries and the consequences of failure to complete a full recovery and premature return to trainings [5, 6].

Unfortunately, these days athletes motivated by desire to achieve great success put their body under excessive strain, compete although they have not completed recovery and train in spite of the pain [7-10].

The principal cognitive aim of this paper was to characterize the types of pain experienced by professional judo athletes.

Material and methods

The survey covered 75 men who practice judo. All of them have been professional judo athletes for at least six years (Table 1). 33 of them declared that they experience chronic pain – they were qualified as members of the sample group. The athletes who took part in the study included 16 medalists of Polish championships and international tournaments (master international, master, first sports class). The results were analyzed considering the division into subgroups where the criteria were the following: age (seniors-juniors), years of

training (less or more than 10 years), proficiency (medalists – non-medalists), number of injuries (more or less than two). Table 2 presents detailed biometric data of the athletes according to their subgroups.

Laitinen pain questionnaire was the research tool. The questionnaire is composed of four parts and enables a comprehensive assessment of pain. The aspects which are evaluated include the nature of the pain in terms of its intensity and frequency, as well as the use of pharmaceutical drugs and limitation of activity. Each question had four possible answers awarded from 1 to 4 points. In all, there were 16 points to collect. The lower the number of points, the better the condition of the person participating in the study. Additionally, the author conducted his original survey with biometric data, information on the trainings and biological regeneration and the location of pain and past injuries [11].

Standard statistical tools – arithmetic mean and standard deviation – were used for the purposes of formulation of the materials. Pearson correlation coefficient was used to determine the relation between characteristics. The differences between particular collections of data were determined on the

basis of t-distribution test for independent groups. Minimum level of significance was $p \leq 0,05$.

Results

General pain index was determined at 4.33. The highest value was 11 (one athlete) and the lowest was 2 (four athletes). No significant difference between the results of subgroups was observed (table 3).

Taking into consideration all the athletes subject to the study the highest recorded value concerned the frequency of pain (1.73). The value of pain intensity was slightly lower (1.55). The values recorded in the categories of limitation of activity (0.79) and the use of drugs (0.27) were significantly lower ($p < 0.001$). The medalists of championships and athletes who suffered a larger number of injuries declared greater pain intensity ($p < 0.05$). In the remaining categories there were no significant differences between the subgroups (Table 4).

The pain was most common in the knees (19 athletes) and lower back (15 athletes). The pain within upper limbs was less common – eight athletes suffered from arm pain and five

Tab. 1. Characteristic of research groups

	number of people	age [years]	body height [cm]	body mass [kg]	training experience [years]	amount of trainings [n/week]
Group 1 (judoists with pain)	33	21.74 ±2.45	177.61 ±6.58	77 ±11.38	11.23 ±4.12	4.96 ±1.78
Group 2 (judoists without pain)	42	21.14 ±2.71	178.4 ±7.08	77.56 ±11.96	9.14* ±3.98	5.24 ±1.05

* $p < 0.05$

Tab. 2. Characteristic of judoists (divided into subgroups)

		number of people [n]	age [years]	body mass [kg]	body height [cm]	training experience [years]	amount of trainings [n/week]
age	seniors	20	23 ±2.42	80.1 ±12.2	177.75 ±6.86	13.47 ±2.56	5.26 ±1.66
	juniors	13	19.83*** ±0.38	72.23* ±8.28	177.38 ±6.38	7.38*** ±3.59	3.8 ±1.92
sports level	medalists	16	22.44 ±2.75	80.63 ±10.42	179.31 ±6.48	13.5 ±2.21	5.43 ±1.71
	non-medalists	17	21.12 ±1.99	73.59 ±11.57	176 ±6.45	8.35*** ±4.11	3.89* ±1.53
training experience	>10 years	20	22.55 ±2.76	78 ±11.72	177.9 ±6.92	13.7 ±2.17	5.17 ±1.89
	≤10 years	13	20.54** ±1.13	75.46 ±11.11	177.15 ±6.26	6.55*** ±2.71	4.25 ±0.96
amount of injuries	>2 times	18	22.93 ±2.81	78.5 ±12.43	177.61 ±7.21	13.67 ±2.49	5.39 ±1.68
	≤2 times	15	20.47** ±0.92	75.2 ±10.09	177.59 ±5.97	7.57*** ±3.52	3.67* ±1.51

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

athletes experienced wrist or shoulder pain. Two athletes complained about the pain in cervical and thoracic vertebrae and three suffered from hip, elbow or forearm pain. Knee pain usually affected older and more accomplished athletes with

more experience. The pain in lower back was experienced by older and more experienced athletes who were less accomplished (Table 5).

Tab. 3. Overall result of Laitinen Scale

		mean value	standard deviation	max	min	difference
age	seniors	4.5	1.36	7	2	NS
	juniors	4.07	2.43	11	2	
sports level	medalists	4.43	1.46	7	2	NS
	non-medalists	4.23	2.17	11	2	
training experience	>10 years	4.35	1.46	7	2	NS
	≤10 years	4.31	2.36	11	2	
amount of injuries	>2 times	4.61	1.46	7	2	NS
	≤2 times	4	2.2	11	2	

Tab. 4. Results of Laitinen Scale with the pain categories

		pain intensity	pain frequency	use of analgesics	decreased activity
age	seniors	1.7 ±0.47	1.75 ±0.71	0.25 ±0.44	0.8 ±0.41
	juniors	1.31 ±0.63	1.69 ±0.94	0.31 ±0.85	0.77 ±0.72
sports level	medalists	1.75 ±0.44	1.81 ±0.98	0.06 ±0.25	0.81 ±0.4
	non-medalists	1.35* ±0.61	1.64 ±0.61	0.47 ±0.8	0.76 ±0.64
training experience	>10 years	1.6 ±0.5	1.75 ±0.91	0.25 ±0.44	0.75 ±0.44
	≤10 years	1.46 ±0.66	1.69 ±0.63	0.31 ±0.85	0.85 ±0.69
amount of injuries	>2 times	1.72 ±0.46	1.89 ±0.9	0.22 ±0.43	0.78 ±0.43
	≤2 times	1.33* ±0.62	1.53 ±0.64	0.33 ±0.82	0.8 ±0.68

* p<0.05

Tab. 5. Location of chronic pain

		foot & calf	knee & thigh	hip	low back	thoracic spine & chest	cervical spine	shoulder	arm & elbow	forearm & wrist	hand
age	seniors	3	14	3	10	2	1	3	1	3	6
	juniors	1	5	0	5	0	1	2	2	2	2
sports level	medalists	3	12	1	6	1	0	3	1	2	8
	non-medalists	1	7	2	9	1	2	2	2	3	0
training experience	>10 years	3	14	2	11	1	0	4	1	3	8
	≤10 years	1	5	1	4	1	2	1	2	2	0
amount of injuries	>2 times	3	12	2	11	1	0	4	1	2	6
	≤2 times	1	7	1	4	1	2	1	2	3	2

Tab. 6. Effects of injuries

		discomfort during exercises	discomfort during daily activities	pain during exercises	pain during daily activities	no complaints
age	seniors	15	1	9	0	1
	juniors	5	3	3	2	4
sports level	medalists	14	1	6	1	0
	non-medalists	6	3	6	1	5
training experience	>10 years	15	2	8	1	1
	≤10 years	5	2	4	1	4
amount of injuries	>2 times	15	2	6	1	1
	≤2 times	5	2	6	1	4

The injuries usually caused discomfort (20 participants) and pain (12 athletes) during training. These problems were less common during every-day activities. Only five athletes did not declare any negative consequences of past injuries. The discomfort during practice usually concerned older and accomplished athletes who had more experience and suffered more injuries. The pain was related to the age of the participants. The proficiency and number of injuries did not affect the circumstances in which the pain occurred (Table 6).

All judo athletes who participated in the study suffered at least one injury (that prevented them from training for at least a week). On average, the participants suffered 3.53 injuries. The absence caused by the most serious injury lasted on average 11,63 weeks. However, the number of injuries and the duration of training breaks did not have any influence on the incidence of pain. Pain intensity and the number of trainings within a week were strongly correlated ($r=0.39$; $p<0.05$).

Discussion

Pain is a sensation of subjective and individual nature and can assume different forms and intensity. The most common type of pain is the pain of lumbosacral region of the spine. It is experienced by around 80% of the society. It is more and more common that the pain affects young and active people and its intensity and frequency grow with time [11-16]. Personal research seems to confirm that lower back pain is one of the most common types of chronic pain.

The study did not concern the causes of pain. According to Danneels and coworkers [17] the key role in the prevention of lumbosacral pain is played by the multifidus muscle. It has been shown that training based on stabilization exercises in combination with exercises strengthening the multifidus muscle can prevent the pain in the said area [17].

Among the risk factors for back pain there are, among others, postural defects (e.g. scoliosis) which lead to incorrect distribution of loads, degenerative joint disease, sedentary lifestyle, obesity and excessive physical activity, hard work, overloading of the locomotor system [18-21]. Excessive stress placed upon the body during trainings can lead to bodily injuries. The desire to achieve success may result in overtraining and maladjustment of the intensity of trainings to the age

and health condition of the athletes. Injuries caused by premature return to trainings after injuries are very common. An athlete who resumes training before making full recovery may easily aggravate the injury. Steroids favour such aggravation as they reduce the pain, inflammation and improve the functioning of the locomotor system and thus make the athlete believe that he/she is healthy and can resume physical activity. Inadequate warm-up routine or lack of warm-up are other causes of bodily injuries. Exercises done wrong, lack of protection or exercises which are too difficult may also lead to injuries [22-24]. Personal research demonstrates that chronic pain is usually the result of recurrent injuries.

Pain and injuries are usually a consequence of inadequate training or incorrect health behaviour. Recurrent bodily injuries and the following consequences, such as chronic pain, may be a result of inappropriate choice of treatment or lack of rehabilitation. Many injuries can be prevented by practicing correct joint stability, controlling muscular strength and increasing flexibility. Stretching exercises should be an inseparable part of training [25]. Biological regeneration is equally important in the prophylaxis of injuries. Biological regeneration in the form of water procedures, massage, sauna sessions or physical therapy stimulates regeneration, boosts immunity, eliminates fatigue, raises energy levels, increases the resistance to stress and improves performance [26-29].

The negative aspects of physical activity presented in the paper should not affect the general evaluation of physical activity as an element of prevention of diseases of affluence. Sports and martial arts are undoubtedly good for our health, even though they are considered to be dangerous due to high incidence of injuries during training [2,3,30]. However, research conducted at the University Hospital of Groningen [31] demonstrates that among the people who practice football, volleyball, gymnastics and martial arts, the practitioners of martial arts suffered the lowest number of injuries. The universal nature and the diversity of exercises make martial arts suitable for people of all ages. The practitioners of martial arts are stronger and tougher and are characterized by better motor coordination, balance and flexibility [32-35]. Regular training in martial arts can help one change lifestyle, eliminate unhealthy habits and may affect mental health [36-38].

Conclusions

1. The majority of athletes experienced chronic pain in the musculoskeletal system regardless of their age, proficiency or years of training, it is proof that overtraining is very common in judo competitors.
2. The pain in the knees and low back – parts of the locomotor system upon which the greatest stress is placed during judo training and fight – was the most common.
3. The intensity of the pain was related to the number of training sessions. This may be an indicator of excessive stress placed upon the body and insufficient post-exercise restitution.

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