

THE THERAPEUTIC PROCEDURES OF INJURIES FEMALE AND MALE SENIORS PARTICIPATING IN XXXIX POLISH KARATE KYOKUSHIN CHAMPIONSHIPS

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- trauma,
- treatment

Abstract:

Introduction. The risk of injury can be minimized if karate athletes use proper technique, have the right equipment and are focused and thoughtful. However, despite of all precautions the risk of injuring cannot be completely excluded. In this situation, the attention should be focused on minimizing effects of injuries.

The aim of the work. The purpose of the study was to evaluate the treatment and rehabilitation of traumatic injuries in participants of XXXIX Polish Karate Kyokushin Championships.

The material and the methodology. The questionnaire survey was conducted among 41 karate kyokushin athletes divided into two groups. The first group consisted of 14 males and the second group consisted of 27 female individuals - participants of XXXIX Polish Kyokushin Karate Championships. Respondents completing the survey were asked to answer questions about the: injuries' treatment, use of medical services and physiotherapists, a variety of wellness and subjective evaluation of current treatment.

Results. 100% males and 63% females treated injuries individually. Men from the first group mainly used cold compresses, analgesic ointments (86%) to treat the injuries. Females from the second group (83%) also mostly used analgesic ointments. Male athletes largely used medicinal baths (29%), females - magnetotherapy (21%). 43% of men and 54% of women mostly benefited from sauna and swimming in the pool as a wellness treatment.

Conclusions. Karate athletes usually treated injuries individually. Karate athletes do not see the need of using wellness after training. It is important to draw attention to the fact that the introduction of elements of wellness to athletes is significant.

INTRODUCTION

Karate kyokushin is a Japanese martial art developed by Masutatsu Oyama in 2nd half of the 20th century. At the present it is one of the most popular styles of karate in the world. Training of the karate kyokushin consists of the 3 basic parts - kihon, kata and kumite [11]. Kihon is divided into teaching 3 basic techniques such as: striking, kicking and blocks. Kata in turn, are formal systems of defense and attack techniques. Kumite is a full-contact sport fight of opponents [7,12] during which excluded the possibility of attacks on knees and spine, punches, as well as use of techniques of the knee to the head.

Due to the full-contact character of the karate, contusions are common and frequent in this type of martial art [6,23]. The risk of injury can be minimized if the karate athletes use proper technique, have protectors and are properly focused and prudent. However, despite of

maintaining all safety precautions the risk of injuring cannot be completely excluded. In this context, as much as possible attention should be focused on minimization effects of the damage what is achieved by use of treatment and/or rehabilitation.

THE AIM OF THE STUDY

The purpose of this study was to evaluate the treatment and rehabilitation processes of traumatic injuries athletes practicing karate kyokushin which participated in XXXIX Polish Karate Kyokushin Championships.

MATERIAL AND METHODS

Questionnaire survey was conducted amongst the group of 41 people selected randomly. The inclusion criteria for the study were: regular participation in karate training for at least five years and a consent to participate in the study. Exclusion criteria were: lack of the consent to participate in the study, irregular participation in karate trainings and too short training experience (less than five years). Then the 41 athletes were divided into two groups. The first group consisted of 14 males and the second consisted of 27 females - participants XXXIX Polish Kyokushin Karate Senior Championships.

Among males, the mean age of was 22 ± 5 years (18-33), mean weight of - 76 ± 1 kg (57-100), mean body height of - 181 ± 6 cm (172-195). 13 individuals showed right laterality of the upper limbs, ambidexterity was declared by 1 person. Prevailing right laterality of the lower limbs (11 athletes), right and left (both) laterality of the lower limbs indicated 3 athletes. Among the male group the mean of training experience was 10 years. These athletes practiced karate approximately for 3-4 days per week, additionally they practiced another kind of physical activity for more than 3 days per week. The largest group were athletes with: 3 kyu⁸ (37%), subsequently 4 kyu (14%), 2 kyu (14%), 1 kyu (14%), 1 dan (14%), 2 dan (7%).

Among females in turn, the mean age of was 23 ± 4 years (18-31), mean weight of was 63 ± 7 kg (51-80), mean body height of was 168 ± 5 cm (157-176). 24 females showed right laterality of the upper limbs, left one - remaining 3 females. Prevailing right laterality of the lower limbs (18 females), while left and right laterality of the lower limbs declared 9 of them. The mean of training experience was 10 years. These athletes practiced karate approximately for 3-4 days per week. Also they practiced other physical activities for 2 days a week. The largest group were females with: 2 kyu (38%), then 1 dan (25%), 1 kyu (21%), 4 kyu (8%), 3 kyu (4%), 2 dan (4%). Characteristics of the study groups are presented in Table I.

Table I. Characteristics of the study groups: number (N), age, body weight, body height (mean, standard deviation, minimum-maximum range)

Groups	N	Age [years]	Body height [cm]	Body weight [kg]
Polish Male Championship Seniors	14	22 ± 5 (18-33)	181 ± 6 (172- 195)	76 ± 1 (57-100)
Polish Female Championship Seniors	27	23 ± 4 (18-31)	168 ± 5 (157-176)	63 ± 7 (51-80)

The method of diagnostic survey questionnaire technique was used. Karate athletes anonymously filled out the individual author's questionnaire. Survey included questions about: gender, age, height, weight, laterality of limbs, length of training experience, stage of

⁸ In karate, the following degrees (for persons over 14 years of age): a athletes with no degree kyu - white belt, 10 kyu - orange belt, 9 kyu - orange belt with blue stripe, 8 kyu - blue belt, 7 kyu - blue belt with yellow stripe, 6 kyu - yellow belt, 5 kyu - yellow belt with a green stripe, 4 kyu - green belt, 3 kyu - green belt with brown stripe, 2 kyu - brown belt, first kyu - brown belt with a black stripe. Dan master's degrees: a black belt with a gold stripe - 1 dan black belt with two gold epaulettes - 2 dan and up to the 10 dan.

karate training (kyu/dan), severity of the trainee, treatment of most frequent injuries and injuries of previous surgery, use of wellness after a long and exhausting training. Survey results were collected and subjected to statistical analysis using Microsoft Excel. The mean, standard deviation, minimum and maximum values and severity rates specific indications were calculated.

RESULTS

Respondents were asked to indicate how they treated injuries. In the first group 100% of males indicated to treat injuries individually. Less than a half of respondents (43%) also benefited from the help of a doctor or physiotherapist. In the second group, among women karate athletes also prevailed treatment of injuries by oneself but the rate was lower than in the group of males (63%). 13 females (54%) used a doctor's or physiotherapist's help. Responses are shown in the table below (Table II).

Table II. Indicated treatment of injuries by males, females of Polish Championships: number (N), the percentage of athletes who indicated the way of treatment

Indicated treatment - Polish Seniors Championships males	N	The percentage of males who indicated the treatment
individual	14	100%
by doctor / physiotherapist	6	43%
Indicated treatment - Polish Seniors Championships females	N	The percentage of females who indicated the treatment
individual	15	63%
by doctor / physiotherapist	13	54%

In the next question, respondents were asked to indicate what kind of medical supplies they used to treat injuries. Men from the first group mainly used a cold compress and analgesic ointments or gels (both 86%). Slightly more than 20% of the male karate athletes used cooling spray. They also indicated answers such as: cryotherapy, exercises at home and warm compresses (all 7%). Females from the second group, similarly to males, mainly used analgesic ointments or gels (83%) and cold compress (75%). More than 50% of the female athletes used cooling spray. Females also indicated responses such as: antioedematous, cryotherapy and painkillers. 1 female indicated not to heal injuries. Responses are shown in Table III.

Table III. Indicated treatment of injuries by males, females of Polish Championships: number (N), the percentage of athletes who indicated self-treated

Indicated treatment - Polish Seniors Championships males	N	The percentage of males who indicated the type of self-treatment
cold compresses	12	86%
ointments / gels analgesic	12	86%
cooling spray	3	21%
cryotherapy	1	7%
excercise at home	1	7%
warm compresses	1	7%
lack	1	7%
Indicated treatment - Polish Seniors Championships females	N	The percentage of females who indicated the type of self-treatment
ointments / gels analgesic	20	83%
cold compresses	18	75%
cooling spray	13	54%
warm compresses	3	13%
antioedematous	2	8%
cryotherapy	1	4%

painkillers	1	4%
lack	1	4%

In another question, respondents were asked to indicate which physical therapy procedures they applied to treat injuries. Men from the first group mainly used: medicinal baths and magnetotherapy (both 29%). 21% of athletes used classic massage and 14% of them - iontophoresis or sonophoresis. 1 person applied hand exercise. Nearly 40% of the karate athletes did not use any treatment in the field of rehabilitation. Females from the second group, in order to treat injuries and damages, mainly used magnetotherapy (21%), therapeutically baths (13%) and the treatment of iontophoresis or sonophoresis (both 13%). Karate female athletes also least used various forms of massage and laser biostimulation. 33% of the athletes did not use any rehabilitation procedures. Responses are shown in the table below (Table IV).

Table IV. Indicated rehabilitation of injuries by males, females of Polish Championships: number (N), the percentage of athletes who indicated the type of therapy

Indicated rehabilitation - Polish Seniors Championships males	N	The percentage of males who indicated the type of therapy
lack	5	36%
magnetotherapy	4	29%
therapeutic baths	4	29%
classic massage	3	21%
iontophoresis / sonophoresis	2	14%
hand exercises	1	7%
Indicated rehabilitation - Polish Seniors Championships females	N	The percentage of females who indicated the type of therapy
lack	8	33%
magnetotherapy	5	21%
iontophoresis / sonophoresis	3	13%
therapeutic baths	3	13%
cryochamber	2	8%
classic massage	2	8%
deep tissue massage	2	8%
laser	1	4%
sports massage	1	4%

In another question athletes were asked if they suffered an injury that required surgery. In the group of men one person required arthroscopic knee surgery. Similarly, 1 female required arthroscopic knee surgery.

Afterwards, karate athletes were asked to answer whether they believe the treatment was sufficient. 57% of men in the first group rated the treatment as sufficient, 21% indicated response that treatment was not sufficient, 22% of them had no opinion. 88% of women thought that treatment was adequate, 4% of them had the opposite view and 8% had no opinion. Responses of karate kyokushin athletes are shown at two figures under the text.

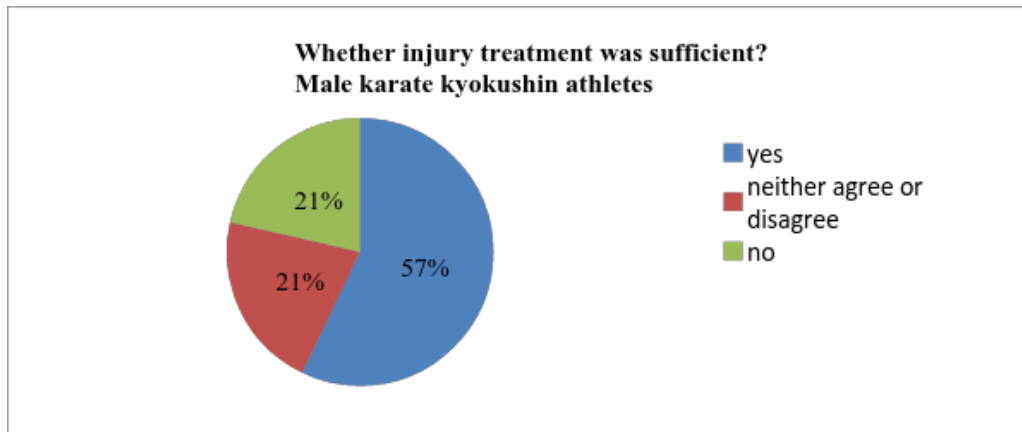


Figure 1. Sufficiency of treatment injuries by males of Polish Championships.

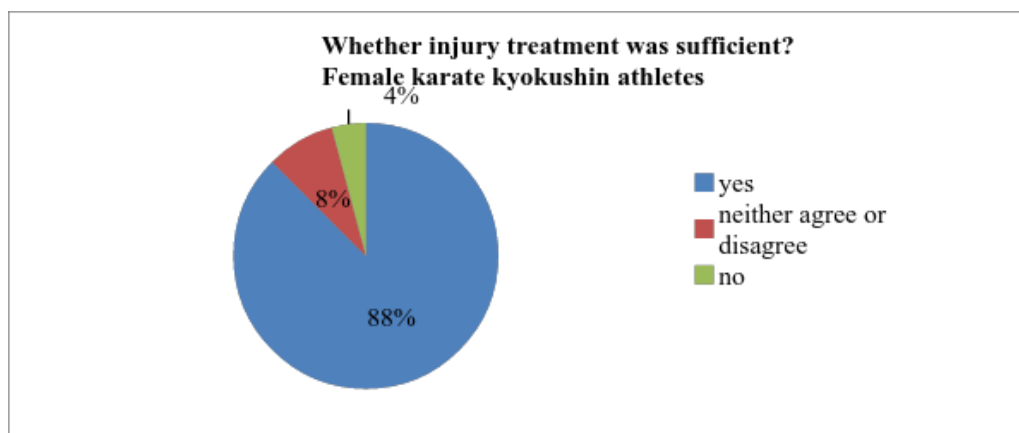


Figure 2. Sufficiency of treatment injuries by females of Polish Championships.

Table V. presents the answers to indicate whether and what treatment of wellness karate athletes benefited from after a long and exhausting training. In the first group 43% of karate kyokushin practitioners benefited from sauna, swimming pool 36% and 14% used massage. 36% did not use any wellness. More than half of women (54%) from the second group used sauna, 38% of females also attended to swimming pool, used massage (more than 20%) and medicinal baths (4%). 38% of women do not use the wellness.

Table V. Indicated wellness used by males, females of Polish Championships: number (N), the percentage of athletes who indicated the type of wellness

Indicated wellness - Polish Seniors Championships males	N	The percentage of males who indicated the type of wellness
sauna	6	43%
swimming pool	5	36%
do not use	5	36%
massage	2	14%
Indicated wellness - Polish Seniors Championships females	N	The percentage of females who indicated the type of wellness
sauna	13	54%
swimming pool	13	38%
do not use	9	38%
massage	5	21%
therapeutic baths	1	4%

DISCUSSION

In the literature several ways to therapy athletes' injuries can be found. Recommended treatment usually consists of elements based on the RICE method (Rest, Ice, Compression, Elevation), medical treatment and specialist rehabilitation, including neuromuscular training and training of center stabilization [13,14,22]. Some of the healing process pay attention to the aspects of sports psychology and nutrition (supplementation) [8,9].

Nishime [20] notes that published studies about injuries and medical issues in martial arts are very limited and notes that there are some research considering the epidemiology of injuries found in martial arts competitions but they are restricted when compared to the other sports. In combat sports, researchers pay particular attention to the mechanisms contributing to injuries such as: improper preparation for physical exercise, excessive exhaustion after training, inadequate frequency of trainings. Attention is also paid to the elements of the prevention of injury such as: use of proper body protection against impact, vigilant supervision of coaches and strict refereeing during the event [4,6,16].

Pintilei and Slăvilă [21] presented a rehabilitation program using aspects of prevention in macro-trauma occurred during karate shotokan athletes. Authors noted that physical therapy methods (such as massage) and psychopedagogic methods (relaxation, autotraining) had positive effects on athletes. Authors also observed that kinetic rehabilitation, psychotherapy and massage are the most important methods of strategies in sport activity to obtain a reduction of the number of traumas.

Boostani M.A., Boostani M.H., Rezaei A.M. [1] evaluated common injuries in the Iranian National Karate team. Authors results showed that 143 injuries during the tournaments. Trauma was the most common injury (74.8%). 69.9% of injuries occurred to the head and neck. 91.6% of injuries occurred to the upper limbs. The majority of injuries were treated by applying RICE method, but these method was not fully respected. 51.4% of total injuries were treated with the use of ice packs, 14.4% of cold spray, 18.8% of cotton and sterile gauze and 4.4% of topical gel. In three cases was the need of transferred athlete to the hospital.

Boostani et al. [2] described the incidence, type and mechanisms of sport injuries in male karate athletes of Iran. The most common injury reasons were high pressure (26.9%), improper warm up (22.4%) and injuries inflicted by a partner (14.9%). After injury, athletes mostly reduced the activity (36.2%), used topical gel (22.4%), were operated and used medical prescriptions (both 12.1%). While, in rehabilitation period they mostly used physiotherapy (27%), straightening training (25.4%), aquatic therapy (15.9%) and sauna (14.3%). Authors suggested that improving coaches and athletes' awareness of the prevailing injuries in this sport, strict judging and heavy penalties for uncontrolled blows, using protectors and more safety are the ways of decreasing injuries and preventing athletes from back to the exercises and competitions before being fully cured.

Karate athletes from both groups usually treated injuries by themselves and treatment was not always sufficient (especially among male athletes, where the percentage of males dissatisfied with the results of treatment was more than 20%). Perhaps it would make other, more specialized and complex elements of the rehabilitation of these athletes. It is also possible that their injuries were not serious enough that karate athletes feel the need to take professional help. However, it should be always noted that self-treatment of injuries may not be sufficient. It may lead to inadequate healing of the tissues and subsequent accumulation of damage and the formation of re-injury. Similar results were obtained by McNoe and Chalmers [17] who showed that the treatment of injuries (especially soft tissue injuries) among 880 female and male soccer players was insufficient. Only 3.9% of the players after the injury immediately applied fully respected RICE method, only a third cooling place of the damage.

Between one-third and one-quarter of the players used methods that are not recommended immediately after the injury (for example: massage, running). It has not been evaluated if the players are aware of the proper treatment of injuries and whether they required education in this field. Most of the injuries occurred during matches and training sessions were taken and treated on the field and usually started after 15 minutes. In 60-70% of the players undertook treatment, in 20% - coaches and medical staff only 5-10%. The results are similar to the study of Nielsen and Yde [19], who investigated injuries among 123 soccer players. Authors showed that football players in 50% of the cases healed injuries individually and the RICE method applied only 5% of them.

In the male and female group one person required arthroscopic knee surgery. A similar incident of a male's knee injury described by Huang, Hsu and Wang [10]. They reported third-degree ACL ligament injury in the athlete with the black belt in shotokan karate (suffered an injury during a demonstration of the kicking techniques). The athlete required arthroscopy of the knee. Cynarski and Kudłacz [5] studied frequency and causes of injuries in individual martial arts and combat sports (boxing and kick-boxing, judo, jujutsu, karate). Mentioned authors reported that the most frequent injuries were broken bones (21%) and the second ones were damages of knee ligaments (16%). Kudłacz and Cynarski [15] also marked that in 3 cases (5.5%) injuries resulted in the end of sporting career and usually this was caused by the knee injuries.

A large percentage of karate kyokushin athletes from our study (among athletes participating in the Polish Championships - 36% of men, 38% of women) do not use the wellness facilities after a very heavy and comprehensive training. Minor injuries are often neglected not only by players, but also by doctors and trainers, which may be non-confirmation of wellness and the treatment of the injury using only one method (for example only cold compresses, analgesics ointments or orthotics). This may be due to funds' lacking, and a low number of the clubs in Poland that are able to provide constant medical care and physiotherapy. Additionally, karate for most practitioners is only a form of a leisure activity which also can significantly burden the body. Therefore, the awareness in the field of treatment and rehabilitation for trainers and karate athletes is essential to timely counteract the negative effects of this form of leisure activity. Mikołajczyk and Gloc [18] who analyzed epidemiology of injuries and wellness in 79 Silesian basketball players also noted that wellness was used occasionally by some athletes (only I and II League players). According to the authors players usually used cold compresses (with ice or gel), in turn they less benefited from dry and steam saunas, vibration and dry partial massages. Authors highlighted that even in the clubs in which wellness procedures are freely used, they are voluntary and often ignored by basketball players.

According to Bujak [3] practicing martial arts of a massive scale should affect the interest of the health issues and the prevention of accidents. Author highlighted that serious injuries required medical intervention are often diagnosed and treated well, although a period of convalescence is often drastically shortened. Furthermore, recommended treatment is reduced. What is more, Bujak noticed the problem of a small amount of sports physicians and embracing athletes care by often incompetent general practitioners. Author emphasized a systematic necessity of monitoring injuries in the self-defense and martial arts.

The authors of this study believe that the effectiveness of treatment and prevention of injuries among practitioners of all combat sports will increase, along with the more widespread availability of medical care and rehabilitation of athletes, frequent use of protectors and commonplace education in this area of the whole team of trainers, sports physiotherapists and doctors of various specialties. The problem of this issue is very large and because of the few scientific reports should be the subject of further researches and discussions.

CONCLUSIONS

1. Karate kyokushin athletes mostly treated injuries by themselves.
2. Athletes from both groups do not see the need of using wellness procedures after exhausting training.
3. It is important to draw attention to the fact that the introduction of elements of the athletes' wellness is very significant, especially after a long and exhausting training.
4. Further researches in the field of the treatment and rehabilitation of karate athletes are needed.

REFERENCES

1. Boostani M.H., Boostani M.A., Rezaei A.M. *Type, incidence and causes of injuries in karate tournaments*. Ido movement for culture. Journal of Martial Arts Anthropology 2012; 12(3): 19-22.
2. Boostani M.H., Boostani M.A., Rezaei A.M., Khatamsaz S. *The study of sport injuries in the national team karate of Iran (kumite field)*. Ido movement for culture. Journal of Martial Arts Anthropology 2011; 11(4): 27-34.
3. Bujak Z. *Urazowość w sportach walki na przykładzie taekwon-do / Incidence of injuries in martial arts with taekwon-do as an example*. IDŌ – Ruch dla Kultury / Movement for Culture 2008; 8: 118-132.
4. Critchley G.R., Mannion S., Meredith C. *Injury rates in Shotokan karate*. British Journal of Sports Medicine 1999; 33: 174-177.
5. Cynarski W.J., Kudłacz M. *Injuries in martial arts and combat sports – a comparative study*. Archives of Budo 2008; 4: 91-97.
6. Destombe C., Lejeune L., Guillodo Y., Roudaut A., Jousse S., Devauchelle V., Saraux A. *Incidence and nature of karate injuries*. Joint Bone Spine 2006; 73: 182-188.
7. Harrison D.W. *Emergency medicine as a martial art*. The Journal of Emergency Medicine 1999; 17(1): 115-121.
8. Hoskins W., Pollard H. *Hamstring injury management - Part 2: Treatment*. Manual Therapy 2005; 10: 180-190.
9. Howatson G., van Someren K.A. *The Prevention and Treatment of Exercise-Induced Muscle Damage*. Sports Medicine 2008; 38(6): 483-503.
10. Huang K.C., Hsu W.H., Wang T.C. *Acute injury of anterior cruciate ligament during karate training*. The Knee 2007; 14: 245-248.
11. *IKO Technical Syllabus*. Kyokushinkaikan Honbu, August 2010.
12. Imamura H., Yoshimura Y., Uchida K., Nishimura S., Nakazawa A.T. *Minimal Oxygen Uptake, Body Composition and Strength of Highly Competitive and Novice Karate Practitioners*. Applied Human Science 1998; 17(5): 215-218.
13. Järvinen T.A.H., Järvinen T.L.N., Kääriäinen M., Äärimaa V., Vaittinen S., Kalimo H., Järvinen M. *Muscle injuries: optimising recovery*. Best Practice & Research Clinical Rheumatology 2007; 21(2): 317-331.
14. Keats R.M., Emery C.A., Finch C.F. *Are we having fun yet? Fostering adherence to injury preventive exercise recommendations in young athletes*. Sports Medicine 2012; 42(3): 175-184.
15. Kudłacz M., Cynarski W.J. *Injuries in martial arts and combat sports – preliminary results of research*. Archives of Budo 2007; 3(3): 62-67.
16. McLatchie G.R., Morris E.W. *Prevention of karate injuries - a progress report*. British Journal of Sports Medicine 1977; 11: 78-82.
17. McNoe B.M., Chalmers D.J. *Injury prevention behaviour in community-level soccer players*. Journal of Science and Medicine in Sport 2011; 14: 482-488.

18. Mikołajczyk R., Gloc D. *The sports injuries epidemiology and wellness in Silesian basketball team players*. Scientific Review of Physical Culture 2013; 3(3): 5-15.
19. Nielsen A.B., Yde J. *Epidemiology and traumatology of injuries in soccer*. American Journal of Sports Medicine 1989; 17(6): 803-807.
20. Nishime R.S. *Martial Arts Sports Medicine: Current Issues and Competition Event Coverage*. Current Sports Medicine Reports 2007; 6: 162-169.
21. Pintilei S., Slăvilă M. *Rehabilitation aspects in do-Shotokan karate*. Sport Medicine Journal 2006; 5: Internet source:
<http://www.medicinasportiva.ro/SRoMS/english/Journal/No.5/Rehabilitations%20aspects%20in%20do%20Shotokan%20karate%20full.html> /accessed on: 16.02.2014/
22. Sherry M.A., Best T.M. *A comparison of 2 rehabilitation programs in the treatment of acute hamstring strains*. Journal of Orthopaedic & Sports Physical Therapy 2004; 34(3): 116-125.
23. Zetaruk M.N., Violan M.A, Zurakowski D, Micheli L.J. *Karate injuries in children and adolescents*. Accident Analysis and Prevention 2000; 32: 421-425.