

Risk related to passion – comparative analysis of traumas on the example of judo and wrestling

Authors' Contribution:

- A Study Design
- B Data Collection
- C Statistical Analysis
- D Manuscript Preparation
- E Funds Collection

Kazimierz Witkowski^{ABCDE}, Jarosław Maśliński^{ABCD}, Magdalena Szalek^{ABC},
Wojciech Cieśliński^{ABC}, Juliusz Migasiewicz^{DE}

University School of Physical Education, Faculty of Sport Science, Wrocław, Poland

Source of support: Departmental sources

Received: 10 June 2015; **Accepted:** 19 October 2015; **Published online:** 29 December 2015

ICID: 1189295

Abstract

Background & Study Aim: Every sport, when fighting with each other at least two athletes, and the essence of struggle is to select one winner (apart from the possible in many sports tie – lack of a decision), and if the fight is to physical effort, there is always a risk of injury and even death (one or even both athletes). Sport fighting is also a need to overcome their weaknesses in order to finally realize their passions. Combat sports are disciplines with elevated degree of injury rate. The aim of this study was to verify the hypothesis: there are more injuries in judo than in wrestling; judo involves injuries of upper extremities in comparison to wrestling where injuries of lower extremities are more frequent; in both sports, injuries occur the most often during competitions.

Materials & methods: The study involved 117 male and female competitors, including 59 of judo and 58 of wrestling and. Information about sport injuries were gathered by means of specially developed questions contained in the questionnaire. Obtained results were analysed.

Results: The main causes of the injuries in judo indicated by the respondents include poor warm-up (41%), incomplete healing of previous injuries (37%) and direct fight (22%). On the other hand, in wrestling injuries are caused by direct fight (44%), poor warm-up (29%) and incomplete healing of previous injury (27%). The vast majority of competitors responded that they continue to participate in training/competition despite pain. The answers provided by the competitors reveal that 97 out of 117 respondents (82.9%) suffered from at least one injury during their sporting career. The following number of athletes in the study group (judo, wrestling) suffered from injury: judo 44; wrestling 80. The most frequent injures included the ones of lower extremities: judo 27; wrestling 33. Most of the respondents suffered from an injury in their sporting career.

Conclusions: The hypothesis turned out to a large extent to be false. In proportion more injuries (65%) were noted in wrestling (especially within upper extremity and head). However an issue turned out to be real, that lower extremity was most prone to injuries (most among judo athletes) followed by upper extremity and head, but this relationship is conspicuous among wrestling athletes. In general, lower traumatism among judo athletes (with the exception of lower extremity) can be explained by the fact that in judo the basic element of training is safe fall (*ukemi waza*).

Key words: combat sports · injury · personal weaknesses · *ukemi waza*

Author's address: Kazimierz Witkowski, Department of Sport Didactics, University School of Physical Education in Wrocław, Paderewskiego 35, 51-612 Wrocław, Poland; e-mail: katedra.ds@awf.wroc.pl

Technique – noun a way of performing an action [41]

Safe fall technique – a method to control the body while it is losing the balance to provide effective shock absorption during collision with the ground or maximal minimization of potential injuries [27]

Ukemi waza – safe fall technique

Ukemi – the term for break falls designed to protect the body when thrown [42]

Waza – a technique or movement which is based on a standard form and is used to challenge and defeat the opponent [42]

INTRODUCTION

Every sport, when fighting with each other at least two athletes, and the essence of struggle is to select one winner (apart from the possible in many sports tie – lack of a decision), and if the fight is to physical effort, there is always a risk of injury and even death (one or even both athletes). Sport fighting is also a need to overcome their weaknesses in order to finally realize their passions. Combat sports are disciplines with elevated degree of injury rate.

According to the theory of combat sports [1], judo and wrestling are the most popular sports in the group of *throws & grips to immobilise opponent's body*. They share the following features: the fight starts in vertical posture; points are obtained by the athlete who is able to throw the opponent off balance and to cause his/her fall to the mat; the fight may be continued in horizontal posture; the fight may be won before the end of the regular time; the fight is extended if it is not finished in the regular time; there is high motor similarity between many ways to throw the opponent off balance (throws technique) and *to immobilise the opponent's body* during fight conducted in vertical posture; the fight is performed on the ground which cushions the fall (mats).

Although strikes are not allowed in judo and wrestling, head and other body parts are likely to be injured, especially during fall and collision with the ground. The results of studies conducted by Witak et al. [2] provide empirical evidence that competitors being attacked constituted 72% of judokas who sustained injuries. This was often caused by fall of the opponent on the body of the athlete thrown off balance, lack of proper cover of the athlete who performed throws. The major direct cause of injuries sustained by athletes being attacked is the fact that they leaned on their arm during the fall and collision with the mat. Sterkowicz study [3] on the population of Polish judokas confirms this trends. Nevertheless, the researcher concluded that this type of injuries is less common among Polish judokas (60.5%). We have not been able to reach similar studies regarding wrestlers.

These findings may be associated with the fact that media arouse the need to achieve success in any discipline among many people and it is highly probable that the desire of winning either in judo or in wrestling increases the risk of injuries of persons who treat these combat sports as one of the most important passion in life.

Recreational sport is associated with a number of positive changes in human body, such as e.g. improved

efficiency, physical fitness, strength and skilfulness, etc. [4-10] As far as professional sport and in fact striving after results are concerned, the situation is rather different. Traumas and sport injuries pose a risk which may be associated with practicing sport. Leaving aside unfortunate accidents in selected disciplines, such as motorcycling, typical overuse injuries of the locomotor system are most frequent [11-15]. Intense improvement of movements as well as enhancement of muscle strength cannot be done without certain risk which in turn may result in accelerated wear of tissues [12].

Often severe trauma of athletes results from aggregating microtraumas which are very frequently underestimated. Currently, the tendency to maximally shorten the way to an important sport success, often beyond organism's capability, leads to overuse of locomotor system which are made up for with ambition or willpower. Very important role is played in this case by the coach who should reasonably treat training process and should not only focus on sports score [16-23].

Injuries in sport often result from being undertrained or over trained. The former one, i.e. injury due to undertraining affect mainly children's and young athletes [11] not mature enough for sport who attempt to compensate shortcomings in strength, speed, endurance or precision of movement with ambition. On the other hand, chronic injuries which often develop for months or years are the consequence of the so-called wear syndrome or simply incorrect and harmful exploitation of the locomotor system [12]. The issue of injuries applies to all sports disciplines. It is also present in combat sports and martial arts. The same happens in the case of judo and wrestling.

The aim of this study was to verify the hypothesis: there are more injuries in judo than in wrestling; judo involves injuries of upper extremities in comparison to wrestling where injuries of lower extremities are more frequent; in both sports, injuries occur the most often during competitions.

MATERIAL AND METHODS

Participants

The study group consisted of 117 athletes of both genders (40 women and 77 men) randomly selected from competitors who practice the combat sports: judo 20 women, 39 men; wrestling 20 women 38 men. The age of the studies people ranges from 14-31 years and the training experience from 3-12 years. Local bioethical commission has given consent to the study.

Methods

Information on injuries has been compiled by means of questionnaire of his own authorship. It was filled in the presence of authors. The questionnaire contains questions regarding i.e. training degree, frequency of training, circumstances, place, time and cause of injury as well as health effects, duration of treatment and consequences. The results of questionnaire analysed for all groups were summed up which provided a quantitative image of the issue in relation of studied group.

Statistical analysis

Proportions indicators have been calculated. The hypothesis has been tested with the use of significance test for independent proportion.

RESULTS

The analysis of the questionnaires reveals that 97 persons out of 117 athletes (82.9%) participating in the questionnaire (women and men) suffered at least once from sports injury during their sporting career. Wrestlers suffered from injuries more frequently (in quantitative terms) than judokas. Wrestlers: 51 times/58 competitors (87.93%); judokas: 46 times/59 competitors (77.96%). Differentiate of proportion 10% is not statistically significance ($p = 1.434$). These phenomena are not differentiated by sex.

In total, the respondents sustained 124 injuries: judo 44 (35.48%); wrestling 80 (64.52%). The most common injuries include injuries of lower extremities (judo 61%; wrestling 41%, $p < 0.05$) and upper limb injury (judo 30%; wrestling 32%) but another difference statistically significant concerns head injuries – judo 5%; wrestling 20%, $p < 0.05$. Similarity concerned the fault location within the torso (Table 1).

Table 1. Location of injuries of various body parts

Location of the injury	Judo (n = 44)		Wrestling (n = 80)		p
	n	%	n	%	
Lower extremity	27	61.36	33	41.25	2.146*
Torso	2	4.54	5	6.25	0.396
Upper extremity	13	29.54	26	32.50	0.323
Head	2	4.54	16	20.00	2.342*

* $p < 0.05$

As far as the number of injuries is concerned, judo competitors suffered from 1-2 injuries, whereas wrestlers from 3-4 and more than 4 injuries. Among the wrestlers studied, injuries occurred more often during

trainings (54%) than during competition (46%). Among the judo competitors the result was the opposite, i.e. judokas more often suffered from an injury during competition (54%) than during training (46%).

The main causes of the injuries in judo indicated by the respondents include poor warm-up (41%), incomplete healing of previous injuries (37%) and direct fight (22%). On the other hand, in wrestling injuries are caused by direct fight (44%), poor warm-up (29%) and incomplete healing of previous injury (27%).

Most respondents of both disciplines asked about sports injury answered that they suffered from an injury at least once during their sporting career. In judo 57 competitors (96.61%) continued to participate in competition/training despite pain. As far as wrestling is concerned 53 persons (91.37%) did not refrain from physical activity despite pain.

Wrestlers trivialised pain more often than judokas which might result in sports injuries sustained by them more often (Table 2). While asked whether they continue to participate in training despite pain, the majority of judokas and wrestlers provided affirmative answer. The vast majority of competitors responded that they continue to participate in training/competition despite pain.

Table 2. Number (and proportions) of people who continue to participate training and competition with pain

Pain perception	Judo (n = 59)		Wrestling (n = 58)		p
	n	%	n	%	
No pain	19	32.2	13	22.41	1.195
Yes: rarely	24	40.67	27	46.55	0.642
Yes: frequently	16	27.11	18	31.03	0.468

DISCUSSION

Despite simple statistical analysis, in our opinion the greatest advantage of this study is comparing the most general indicator related to body injuries sustained during training and competition of two groups of combat sports athletes with similar number, proportion of female and male, similar distribution of age, years of training experience and motor structure – in judo and wrestling. Furthermore, all athletes lived and trained in the same Polish city with 700 thousand inhabitants. Coaches of judo and wrestling have had long-term experience and many documented successes as well as they were highly qualified. Therefore, it may be assumed that these results in some sense reflect the specific properties of judo and wrestling despite so many similarities.

The most significant cognitive achievement is to determine substantial difference in the proportion of injuries with an indication that wrestling (65%) is a combat sport with greater risk of such events than judo. Thus, judo is associated with lower likelihood of body injuries (especially during training) than wrestling.

Recommending judo as the form of health-related training is reasonable [5, 6, 24–26]. The most recent biomechanical analyses performed by Michnik et al. [27, 28] provide significant empirical evidence that 65-year-old male with over 50-year experience in judo more effectively controls his body during fall to the side and collision with concrete ground [27] as well as during a collision with concrete wall [28] and more effectively dissipates the energy of collision in both circumstances than 24-year-old male with less experience in this discipline.

However, nowadays judo is first of all a sport strictly limited by provisions based on old Japanese principles of hand-to-hand fighting. This is a type of wrestling fight which requires special clothing called “judogi”. Although judo stems from military martial art for life and death, its use for self-defence is currently secondary goal. General physical development and afterwards achievement of effectiveness in competitions are the main objectives of contemporary judo. The primary goal obtained by regular exercise and developed by Jigoro Kano, the creator of judo, is “self-improvement”. Since its beginnings, judo in its contemporary form became a combat sport requiring many years of arduous training in which the technique is practiced by means of large amount of repetitions, creating strength and speed, while all external factors are subject to effectiveness [29].

Professional training judo is very heavy and it is necessary to practice 5–6 times per week to obtain high skills. Throws consisting in overthrowing a competitor on the mat are a typical technical element in judo. It is the use of throws in a fight which forces the athletes to learn elements such as falls and rolls which guarantee safety in fight and protect the thrown ones against injuries in all situations [30–35]

Another discipline characterised in terms of injury rates is wrestling. It may be depicted as combat sport in direct confrontation with an opponent. While striving for victory in a fight, competitors use a large variety of technical and tactical actions in order to overcome competitor’s resistance. Such actions may be characterised with rapid change of position and multiple unexpected changes [36].

This study shows that 0.74 of injury falls on one competitor in judo compared to 1.38 in wrestling. It may be assumed that the injury rate in wrestling is nearly twice higher than in judo. Severe injuries of athletes may have a good prognosis provided that appropriate treatment is undertaken by the experts directly after the event. Injuries to lower extremities, followed by injuries to upper extremities are prevailing in both disciplines. Head injuries, mainly ear injuries, are also very frequent in wrestling.

According to Walentukiewicz [37], injuries to upper extremities occurred more often in judo (53% of injuries sustained in this discipline). Predominance of upper limb injuries in judo also showed by Sterkowicz [3, 38].

The result of our studies does not confirm this regularity in the case of judo athletes and wrestlers. Studies performed slightly earlier by Witkowski et al. [39] (30 females, aged between 17–26 years, training experience for 11 years who were leading Polish judokas of various weight categories with medals from Polish Judo Championships) did not reveal significant differences between injuries of upper limb (43%) and lower limb (40%). Pérez-Turpín et al. [40] while observing 57 male judokas taking part in the Spanish National University Championship in 2009 made similar conclusions. Perhaps the causes should be sought in the quality of training which may be affected by qualifications of coaches but also in the choice and selection of candidates for various combat sports.

Another issue which should be the subject of detailed research is the fact that athletes who experience pain due to sustained injuries participate in training and competitions. A great number of pain neglected by the athletes which occur frequently as it is revealed by the results may lead to serious complications and exclusion from training. Pain is a warning and performs a defensive function, protecting the body against re-injury or further overload of already damaged body structure.

CONCLUSIONS

The hypothesis turned out to a large extent to be false. In proportion more injuries (65%) were noted in wrestling (especially within upper extremity and head). However an issue turned out to be real, that lower extremity was most prone to injuries (most among judo athletes) followed by upper extremity and head, but this relationship is conspicuous among wrestling

athletes. In general, lower traumatism among judo athletes (with the exception of lower extremity) can be explained by the fact that in judo the basic element of training is safe fall (*ukemi waza*).

COMPETING INTERESTS

The authors declare that has no competing interests.

REFERENCES

- Kalina RM. Teoria sportów walki. Warszawa COS; 2000 [in Polish]
- Witak H, Sturm H. Spezifische Verletzungen in der Kampfsportart Judo. *Armeesportler*, 1968; 8: 12-13 [in German]
- Sterkowicz S. Accidens in judo in multifactorial epidemiologic analysis. *Akademia Wychowania Fizycznego. Rocznik Naukowy XXII. Kraków, 1987: 199-243* [in Polish]
- Borysiuk Z (Ed.). Proceedings of International Conference on Movement and Health, Glucholazy 17-18 November 2006. Opole University of Technology. Opole; 2006
- Kalina RM. Methodology of measurement, documentation and programming optimal workload continuous with variable intensity – applications in sports medicine, physiotherapy, geriatrics, health-related training, sport for all. *Arch Budo* 2012; 8(4): 235-249
- Boguszewski D, Świdarska B, Adamczyk JG, et al. Judo as a supplementary form of therapy for children with mental retardation. *Arch Budo Sci Martial Art Extreme Sport* 2013; 9: 85-92
- Stokłosa H, Mynarski W. The correlation of bone density parameters with the body composition of students of the Police Academy – the perspective of preventing permanent damage to the body during physical training and interventions. *Arch Budo Sci Martial Art Extreme Sport* 2013; 9: 11-16
- Kulmatycki L, Boroń-Krupińska K. Competence of people conducting yoga classes in Poland – analysis based of websites information. *Arch Budo* 2014; 10: 179-185
- Pilis A, Pilis K, Zych M et al. Determinant factors of aerobic and anaerobic power in martial arts. In: Kalina RM (ed.) Proceedings of the 1st World Congress on Health and Martial Arts in Interdisciplinary Approach, HMA 2015, 17–19 September 2015, Częstochowa, Poland. Warsaw: Archives of Budo; 2015: 106–111
- Vit M, Galkaniewicz B, Bugala M. The effect of hand strengthening techniques in martial arts on bone mineral density – pilot study. In: Kalina RM (ed.) Proceedings of the 1st World Congress on Health and Martial Arts in Interdisciplinary Approach, HMA 2015, 17–19 September 2015, Częstochowa, Poland. Warsaw: Archives of Budo; 2015: 92–97
- Kennedy D, Fitzgerald P. The Children's Sports Injuries Handbook. HarperCollins Publishers, Sydney, Australia; 1998
- Dziak A. Urazy i uszkodzenia sportowe (Sport injuries – their prevention and treatment) *Klinika Ortopedii i Rehabilitacji II Wydziału Lekarskiego Akademii Medycznej w Warszawie. Acta Clinica* 2001; 1(2): 105 [in Polish]
- Smith FW, Rosenlund EA, Aule AK et al. Subjective functional assessment sand the return to competitive sport after anterior cruciate ligament reconstruction. *Br J Sports Med* 2004; 38(3): 279–84
- Ramierz M, Schaffer KB, Shen H et al. Injuries to high school football athletes in California. *Am J Sports Med*. 2006; 34: 1147–57
- Da Rocha AJ, Morales JCP, Sabino SG et al. Prevalence and risk factors of musculoskeletal injuries in parkour. *Arch Budo Sci Martial Art Extreme Sport* 2014; 10: 39–42
- Highlen PS, Bennett BB. Psychological characteristics of successful and non-successful elite wrestlers: an exploratory study. *Journal of Sport Psychology* 1979; 1: 123-137
- Martens R. Coaches guide to sport psychology. Champaign, Human Kinetics Publisher; 1997
- Mitić P, Mitrović M, Bratić M et al. Emotional competence, styles of coping with stressful situations, anxiety and personality traits in judokas. *Serbian Journal of Sports Sciences*, 2011; 5(4):163-169
- Rutkowska K. Training needs of judo practitioners regarding sport psychology. *Journal of Combat Sports and Martial Arts* 2012; 2(3): 97-101
- Lembeck Ch. The mind of a wrestling champion. *Wrestling USA Magazine* 2013; 21
- Tomczak M, Bręczewski G, Sokolowski M. et al. Personality traits and stress coping styles in the Polish National Cadet Wrestling Team. *Arch Budo* 2013; 2: 161–168
- Szabo A, Urbán F. Do combat sports develop emotional intelligence? *Kinesiology* 2014; 46; 1: 53-60
- Rutkowska K, Gierczuk D, Bujak Z. Rationale for mental training of elite wrestlers. In: Kalina RM (ed.) Proceedings of the 1st World Congress on Health and Martial Arts in Interdisciplinary Approach, HMA 2015, 17–19 September 2015, Częstochowa, Poland. Warsaw: Archives of Budo; 2015: 85–91
- Kalina M, Barczyński J, Jagiełło W et al. Teaching of safe falling as most effective element of personal injury prevention In people regardless of gender, age and type of body build-the use of advanced information technologies to monitor the effects of education. *Arch Budo* 2008; 4(4): 82-90
- Gąsienica-Walczak B, Barczyński BJ, Kalina RM et al. The effectiveness of two methods of teaching safe falls to physiotherapy students. *Arch Budo* 2010; 6(2): 63-71
- Kalina RM, Barczyński BJ. EKO-AGRO-FITNESS® original author continuous program of health-oriented and ecological education in the family, among friends or individually implemented – the premises and assumptions. *Arch Budo* 2010; 6(4): 179-184
- Michnik R, Jurkój J, Wodarski P et al. Similarities and differences of body control during professional, externally forced fall to the side performed by men aged 24 and 65 years. *Arch Budo* 2014; 10: 233-243
- Michnik R, Jurkój J, Wodarski P et al. Similarities and differences of the body control during professional collision with a vertical obstacle of men aged 24 and 65. *Arch Budo* 2015; 11: 27-39
- Witkowski K, Maśliński J, Kubacki R. *Kompendium Judo – Tom1, podstawy tachi-waza. AWF Wrocław; 2009* [in Polish]
- Tumanian GS. *Sportivnaja borba, otbor i planirovanie. WiS Moskwa 1984* [in Russian]
- Jagiello W. *Wieloletni trening judoków. COS. Warszawa 2000* [in Polish]
- Laskowski R. *Obciążenia treningowe a wydolność fizyczna kobiet trenujących judo. Gdańsk 2007; AWFis* [in Polish]
- Sikorski W. *Nauka praktyce judo. Warszawa: Polski Związek Judo; 2010* [in Polish]
- Adam M, Smaruj M. The indices of technical-tactical preparation of the World's Judo Champions in Tokyo 2010 as an assessment criterion for individual training *Arch Budo Sci Martial Art Extreme Sport* 2013; 9 33-39
- Jagiello W, Wolska B, Sawczyn S et al. The similarity of training experience and morphofunctional traits as prediction criteria of the sports level in subsequent stages of long-term women's judo training. *Arch Budo* 2014; 10: 201-210
- Kruszewski A. *Zapasy podstawy teorii i praktyki treningu. Warszawa: COS; 2004* [in Polish]
- Walentukiewicz A. *Epidemiologia urazów sportowych, Rocznik Naukowy AWFis w Gdańsku 2002; 13*
- Sterkowicz S. *Analiza wypadków u kobiet i mężczyzn uprawiających judo w latach 1977-1980. Sport Wyczynowy 1983; 4: 33-40* [in Polish]
- Witkowski K, Maśliński J, Stefaniak T et al. Causes of injuries in young female judokas. *Arch Budo* 2012; 8(2): 109-114
- Pérez-Turpín JA, Penichet-Tomás A, Suárez-Llorca C et al. Injury incidence in judokas at the Spanish National University Championship. *Arch Budo* 2013; 3: 211-218
- Dictionary of Sport and Exercise Science. Over 5,000 Terms Clearly Defined. London: A & B Black; 2006
- Budō: The Martial Ways of Japan. Nippon Budokan Foundation; 2009

Cite this article as: Witkowski K, Maśliński J, Szafek M et al. Risk related to passion – comparative analysis of traumas on the example of judo and wrestling. *Arch Budo* 2015; 11: 413-417