

ICSPEK 2013

Head Injuries in Junior Taekwondo Competitions

Cătălin Păunescu^{a*}, Gabriel Pițigoi^a, Mihaela Păunescu^b

^a "Carol Davila" University of Medicine and Pharmacy, Dionisie Lupu Street no. 37, Bucharest, 020022, Romania

^b National University of Physical Education and Sports, Constantin Noica Street no.140, Bucharest, 060057, Romania

Abstract

This paper relies on a systematic analysis of the studies about the injuries occurred during Taekwondo competitions, published in several electronic databases such as: Pubmed, Google Scholar, Proquest, but also a constative and interpretative study based on video analysis. Within this research, we analyzed 732 matches, among which 413 (56%) represented men's events and 319 (44%) women's events performed during the 2012 World Junior Championship held in Egypt. Results revealed that out of the total number of matches, only 7 ended with a KO (2 in women's contests and 5 in men's contests). We consider that the reduced number of KOs (head injuries) is due to the refereeing system, powerful kicks not being necessary in order to win points.

© 2013 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).
Selection and peer-review under responsibility of ICPEK 2013.

Keywords: taekwondo, juniors, injuries, Knockout (KO);

1. Introduction

Nowadays, we are witnessing an impetuous enhancement of sports performances due to the accumulation of knowledge in different scientific domains, which has also been implemented in the athletes' training, so that their entire preparation process takes place at an increasingly higher level (Păunescu, 2011). Taekwondo presupposes repeated-effort, high intensity physical demands. In addition to this, Taekwondo competitions are structured in a similar fashion to boxing and rowing in that athletes are required to meet weight requirements in order to compete (Mohsen et al., 2005). Taekwondo is a contact combat sport in which competitors are always prone to injuries, and the most frequent injuries affect the toes, instep, knee, hips and arms (Chung & Lee, 1994).

Zemper and Pieter (1998) found injury rates for American elite male Taekwondo athletes to be 127.4/1,000 athlete-exposures and for females, 90.1/1,000 athlete-exposures. The most common injury location and type were

* Corresponding author. Tel.: +0-0723089460;
E-mail address: ccptkd@yahoo.com

found to be the lower limb and bruises, respectively, and they were invariably associated with contact. Although taekwondo players are exposed to a substantial risk of sustaining injuries, most injuries appear to be of minimal severity (Lystad et al., 2009).

According to Beis, Pieter and Abatzides (2007), Taekwondo competition injuries have been studied using a case study approach, and most studies on Taekwondo injuries occurred at single tournaments (Zetou et al., 2006).

A prospective study on elite Taekwondo athletes demonstrated that out of a total number of 1,338 A-Es, 93 injuries were recorded during competitions and the most frequent injuries were mild (68.8%) and critical injuries (24.7%), followed by moderate and severe injuries; 4.3% and 2.1%, respectively (Ziaee et al., 2011).

The relation between the top athletes' injuries and success in competitions revealed the fact that the injury rate was associated with performance after variables were held constant (Odds Ratio (OR) = 0.124, $p = 0.039$), and, with each additional injury per match, competitors were 88% (1-0.124) less likely to win a medal (Kazemi, 2012). Mean recovery time is longer in males (33%) than in females (21%), and the weight classes with the highest risk of injuries are: - 68 kg, - 80 kg, and - 87 kg respectively (Păunescu et al., 2012).

2. Material and method

All the matches were captured and processed by means of DARTFISH - Video Software Solution and they were visualized with SilverLight_x64.exe.

2.1. Systematic review

This paper relies on a systematic analysis of the studies related to the injuries sustained during Taekwondo competitions, published in numerous databases: Pubmed (indexed for Medline), Google Scholar, Proquest. This review aims at identifying the most relevant studies concerned with injury prevalence during Taekwondo competitions. An important part of the systematic review process is to perform a qualitative and quantitative evaluation regarding the types of injuries in TKD competitions. By means of the key-words: "competition", "injuries" and "taekwondo", we identified all the studies among which we present those that are the most relevant for this paper (see Table 1).

Table 1. Systematic review of injuries in taekwondo. Study characteristics and results

Study	Number of subjects	Age	Design of study	Outcomes
Lystad RP, Graham PL, Poulos RG. (2013)	-	10-14	Prospective study	The study reveals that children under 10 years had significantly lower IIR(AE) compared with older age groups and black belts had significantly higher IIR(AE) compared with yellow belts
Pieter W, Fife GP, O'Sullivan DM. (2012)	-	Elite athletes	A literature review and suggestions for prevention	The turning kick was most often involved in causing injury: 56.9% of all injuries in the men and 49.8% in the women.
Kazemi M, Chudolinski A, Turgeon M, Simon A, Ho E, Coombe L. (2009)	904 injury reports	Elite athletes	Longitudinal study	The three most common locations of presenting injury were the head (19%), foot (16%), and thigh (9%). The most common mechanism of presenting injury was found to be a defensive kick (44%), followed by an offensive kick (35%). The most commonly injuries were contusions (36%), sprains (19%), and strains (15%).
Kazemi M.	75	Elite	A retrospective	With each additional injury per match, competitors

(2012)			case-series study	were 88% (1-0.124) less likely to win a medal.
Shirani G, Kalantar Motamedi MH, Ashuri A, Eshkevari PS. (2010)	120 male athletes (boxing, taekwondo, kickboxing, Muay Thai)	18-25	Correlation study	95 male subjects had at least one traumatic injury to the face requiring medical treatment. Injuries included facial laceration, bone fractures (nose, mandible, and zygoma), dental injuries (displacement, luxation, fracture, and avulsion), and mandibular dislocation
Ziaee V, Rahmani SH, Rostami M. (2011)	204 athletes	-	Prospective study	Of totally 1,338 A-Es, 93 injuries were recorded during the competitions

2.2. Purpose of the paper

As we could see, most of the studies were focused on senior athletes. The present study is an ascertaining and interpretative one and relies on the video-analysis of 732 matches performed within the World Junior Championship, Egypt, 2012. This paper aims to identify the most frequent high kicks followed by injuries in junior competitions.

2.3. Subjects of the study

By means of video-analysis, we studied the technical actions performed by 724 athletes, among whom 424 were males (56%) and 302 females (44%).

3. Results of the study

Our video analysis revealed the following aspects (see Table 2):

Table 2. Technical actions directed to the upper body

Technical actions	Man	Women
Technical actions that score without consequences	97.34%	96.53%
Head injuries (Knockouts - K.O.)	0.56%	0.27%
Counted technical actions	2.10%	3.20%
Total	100%	100%

4. Discussion and conclusions

We can notice that most of the studies related to injuries in Taekwondo competitions were focused on elite athletes. In this sense, a synthesis of the specialized literature highlights that about one-third of all men's injuries (29.6%) were to the head and neck region, while almost half of the injuries (44.5%) were to the lower extremities, and injuries included facial laceration, bone fractures (nose, mandible and zygoma), dental injuries (displacement, luxation, fracture, and avulsion), and mandibular dislocation (Shirani et al., 2010). Also, the same studies found that out of a total of 1,338 A-Es, 93 injuries were recorded during competitions (Ziaee et al., 2011), 56.9% for men and 49.8% for women. In women's competitions, 15.2% of injuries were to the head and neck and 53.1% to the lower extremities (Pieter et al., 2012).

Also, Kazemi et al. (2006) reported that overall 98% of all the techniques used to score in Taekwondo games are kicks, and the three most common locations of injuries were the head (19%), foot (16%), and thigh (9%). According to the same authors, the most commonly diagnosed injuries were bruises (36%), sprains (19%) and strains (15%) (Kazemi et al., 2009).

As to the studies about Taekwondo competitions on children, they showed that children under 10 had significantly lower A-E compared with older age groups (Lystad et al., 2009).

Our study emphasized that, out of the total number of 3910 technical actions that scored, 1354 were high kicks and, among them, 38 were mild injuries that allowed the fight to continue and only 7 ended the match with a knock out, head injury. We mention that by knock out (KO) we understand the opponent's inability to continue the fight because of an injury caused as a result of a technical action. We believe that the reduced number of KOs revealed in this study, 0.56% in men and 0.27% in women, is due to the multiple weight classes (10 for the men and 10 for the women), but also to the refereeing, the clear touching of the target being sufficient to win points. At the same time, we identified 7 injuries at the face level during the competitions analyzed, having occurred after some non-statutory technical actions. Thus, for an optimal protection, when an athlete gets KO to the head it is recommended that he/she takes a 3-month break from competitive activity, and if the KO is repeated after the 3 months are over, then the break will have to be half a year long. If after this period the athlete gets another KO, he/she must discontinue any competitive activity. In this situation we think that both the coaches and the athletes have an essential role in diminishing the number of injuries, by preparing training programs aiming at the clear touching of the upper body by using technical actions based on speed, not on strength.

However, further studies are still necessary focusing on the construction of junior athletes' technical-tactical profile, as they represent the selection basis for the future Olympic Games.

Acknowledgements

This paper is part of the project “*An ascertaining and prospective study on the technical-tactical profile at junior level*”, developed by the Commission of Research, Training and Documentation within the Romanian Taekwondo WTF Federation.

References

- Beis, K., Pieter W. & Abatzides G., (2006). Taekwondo techniques and competition characteristics involves in time-loss injuries. *Journal of Sports Science and Medicine* 6 (CSSI-2), 45 - 51.
- Chung, K.H., & Lee, K.M. (1994). Taekwondo Kyorugi. *Olympic Style Sparring*, Ed. Turtle Press, p. 115
- Kazemi, M., (2012). Relationships between injury and success in elite Taekwondo athletes. In *J. Sports Sci.* 2012;30 (3): 277-83. doi: 10.1080/02640414.2011.635312. [PubMed - indexed for MEDLINE]
- Kazemi, M., Chudolinski, A., Turgeon, M., Simon, A., Ho, E. & Coombe, L. (2009). Nine year longitudinal retrospective study of Taekwondo injuries. *J Can Chiropr Assoc.* 2009 Dec; 53 (4):272-81.
- Lystad, R.P., Pollard, H., & Graham, P.L. (2009). Epistemology of injuries in competition taekwondo: a meta-analysis of observational studies. in *J Sci Med Sport.* Nov;12(6):614-21. doi: 10.1016/j.jsams.2008.09.013. [PubMed]
- Mohsen, K., Heather, S. & Choung, Y.S. (2005). Pre-competition habits and injuries in Taekwondo Athletes. In *BMC Musculoskelet Disord*; 6: 26. [PubMed]
- Păunescu, C. (2011). Contribuții la ameliorarea pregătirii sportivilor de Taekwondo WTF prin selecția adecvată a acțiunilor eficiente din competițiile de prestigiu. (Doctoral thesis). UNEFS.
- Păunescu, C., Pițigoi, G., Elisabeta, N., & Păunescu, M. (2012). Findings regarding the injury recovery in Taekwondo during Kyorugi. In *Medicina sportiva*, pp 1999-2006
- Pieter, W., Fife, G.P., & O'Sullivan, D.M. (2012). Competition injuries in taekwondo: a literature review and suggestions for prevention and surveillance. [PubMed]
- Shirani, G, Kalantar Motamedi, M.H., Ashuri, A, & Eshkevari, PS. (2010). Prevalence and patterns of combat sport related maxillofacial injuries. In *J Emerg Trauma Shock.* 2010 Oct; 3(4):314-7. doi: 10.4103/0974-2700.70744. [PubMed]
- Zemper, E.D., & Pieter, W. (1998). Injury rates during the 1988 US Olympic Team Trials for Taekwondo. In *Br. J Sport Med*; 23:161-64

- Zetou, E., Komninakidou A., Mountaki, F., & Malliou, P. (2006). Injuries in Taekwondo Athletes. In *Physical Training* Sept 2006. [PubMed]
- Ziaee, V., Rahmani, S.H., & Rostami, M., (2011). Injury Rates in Iranian Taekwondo Athletes; a Prospective Study. *Asian J Sports Med.* 2010 March; 1(1): 23–28. [PubMed]
- Ziaee, V., Rahmani, S.H., & Rostami, M., (2011). Injury Rates in Iranian Taekwondo Athletes; a Prospective Study. *Asian J Sports Med.* 2010 March; 1(1): 23–28. [PubMed]