

Findings regarding the injury recovery in Taekwondo during Kyorugi

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Abstract. *Introduction.* Taekwondo was declared as one of the most popular sport due its high number of practitioners, with a total number of 55 million members. Taekwondo has a high stand because of its series of fast kick blows, its unique spirit, qualities that make a good impression to those who watch this sport. The purpose of Taekwondo contests is given not by the intent of destroying one's opponent, but by the moments in which one has to endure and be able to display mental and physical force and a good inner balancing in difficult situations. *Material and Method.* The study was done on a number of 216 games, from which 124 in masculine and 92 in feminine. In this research we used the observation method, which was based on analyzing the video materials. The data processing was done using the informatics technique: the percentage. *Results.* The study showed that the average time needed for the recovery after accidents is higher for males (33%) than for females (21%), and the weight categories with the highest risk for injury are: 68kg,-80kg,-87kg.. *Conclusion.* From the point of view of discovering the categories with a higher risk of injury, the most exposed for males the most exposed are: -68kg, -80kg, and -87kg and for females -53kg, 57kg, 67kg and 73kg

Key words: Taekwondo, injury, recovery,

Introduction

Taekwondo always brought an enormous interest among people, but mostly among young people. In 2011, the World Taekwondo Federation got to have 197 countries as members and over 6 million active practitioners, while the world population who practices taekwondo is estimated at 55 million people (1).

This interest, not common, for practicing taekwondo, is mostly explained by the coincidence that exists between the intrinsic wish of each individual to auto-improve his personality and the benefic effects that this might bring to the physical ego (biological) - which takes into account the body availability and the spiritual ego- composed by the physical traits with which they are born or which are learned, and over the social ego, which takes into account the social relations and integration.

Today we are witnesses to a major improvement of sport performances due to the knowledge from different fields of science which influenced the science of athletes' training; so, the whole training-educational process is developed at a higher level, taking into account the biological substrate of the organism, the adapting

possibilities and the biomechanics of the movement. The athletes have to face tasks that are harder and harder and which are imposed by the evolution of the technique and the sport tactics.

In taekwondo, the direct fight with the adversary requests a high capacity for effort in order to withstand the rhythm imposed by the adversary, his actions, but mostly in order to be able to initiate vigorous actions during the competition.

The progress registered in taekwondo in the last years has determined a raise in the requests for the athletes and imposed the research and control of the most subtle elements which might have a positive influence on the sports performance and on the injury recovery during the fight, for the athlete to be able to finish the game and even to win it.

We can say that special results in high performance sport are all, almost with no exception, the consequence of interdisciplinary research and of the trainers' creative spirit, of their profound and creative thinking and competence, synthetized in finding new exercises, methods of training and recovery, more efficient than the ones used before.

The taekwondo during kyorugi (direct fight with the opponent) became more and more used due to the show and the reputation, the participants being of all ages, starting with 6 years.

The aspects like safety, avoiding injury and recovery in injury cases became important aspects for this sport.

For the athletes' safety the World Taekwondo Federation set the mandatory protection and rules that say that the athletes who participate in international competitions must have the black belt.

According to some specialty studies a classification of the injury types was made, as follows (2): minor injury, moderate injury and severe injury.

Minor injury is the largest category; the soft tissues are mostly affected, varying from contusions to articulation cricks and contortions. The anatomical structures that are the most exposed to a higher risk are the inferior members and the cervical backbone.

The athlete can interrupt his activity for less than a week. In taekwondo, recent studies show rates of 21 injuries, cases in which the fight cannot be continued, in 1000 athletes, with a rate higher for males than for females.

Here are also the injuries that might be partially recovered in order to continue the fight, in a maximum limit of $i=$ one minute.

Moderate injury include fractures, contortions, tendon and ligament ruptures and neuropraxias (nerves disturbance).

The athlete can interrupt his activity for a period between a week and a month. In this situation the athlete cannot continue the fight, and loses by abandon or KO.

Severe injury. The athlete interrupts his activity for more than one month. Like in the previous situation, the athlete cannot continue the fight and loses by abandon or KO.

Material and Method

Subjects. The study was done on 216 games from which 124 male games and 92 female games.

The research had 263 athletes from 38 countries, with ages between 18 and 28 years, students

enrolled in universities, participants at the World University Championship of Taekwondo, organized in 01-04 July 2010 in Vigo, Spain (3).

The World University Championship is representative because more than 60% of the athletes have important results internationally (4).

Research design

In this research we used the observation method which consists in an intentional, methodical and careful observation, which can be done directly by observing the researched phenomenon by the constant presence during practice and competitions, but also indirectly by analyzing the video material or through discussions with the coaches.

Procedure for data collection

In the present study a systematic and systemic observation was done, by watching the games that and theoretical and factual data and knowledge processing.

Another used method was the graphical representation which gives us a clear image of the obtained results, of their dynamics and their structure; for the presentation and the graphic representation of the results we used Microsoft Excel. The data processing was done using the informatics technique: the percentage.

Results

The data collecting was done according to the following weight categories: masculine (-54kg, -58kg, -63kg, -68kg, -74kg, -80kg, -87kg, +87kg) and feminine (-46kg, -49kg, -53kg, -57kg, -62kg, -67kg, -73kg, +73kg).

According to the preliminary results, there cannot be found trends for injury types for certain weight categories, which shows us that we can group the final results according to the two main categories: masculine and feminine.

In case one or both athletes are injured the main referee will stop the fight, will note the rules violation, if it is the case, and will inform the table referee to start the timer.

If he is not disqualified, the athlete has 60 seconds for recovery or for restarting the fight. In the case of partial recovery, the athlete tries to avoid fighting by specific tricks until almost complete recovery of the fighting capacity or until the end of the game. So, in the following we will present the necessary time for partial or total recovery, so the fight could continue.

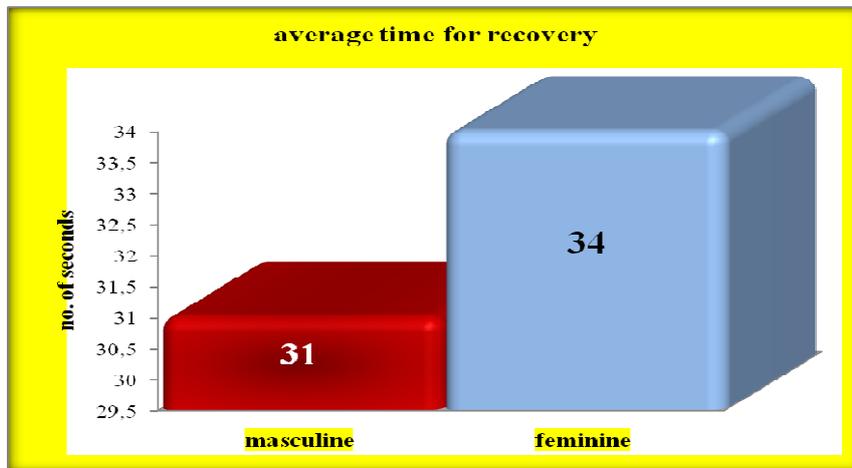


Figure 1. Graphic representation of the time necessary for injury recovery for the two categories: masculine and female

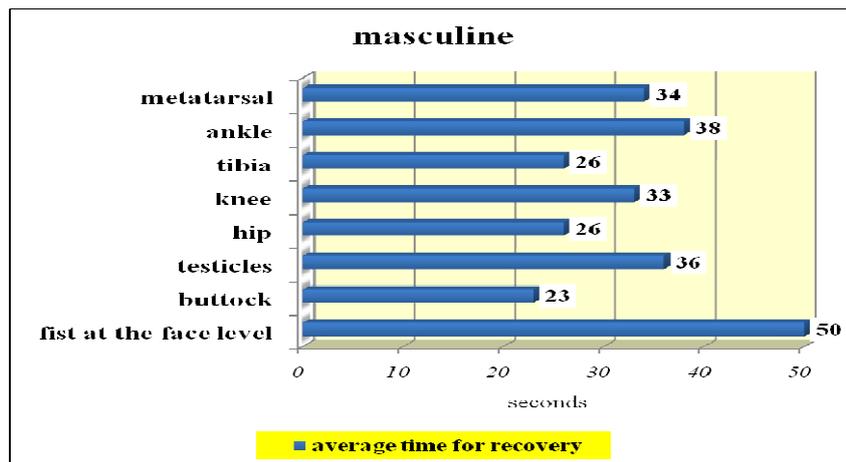


Figure 2. Represents the time needed for injury recovery for males, for different segments

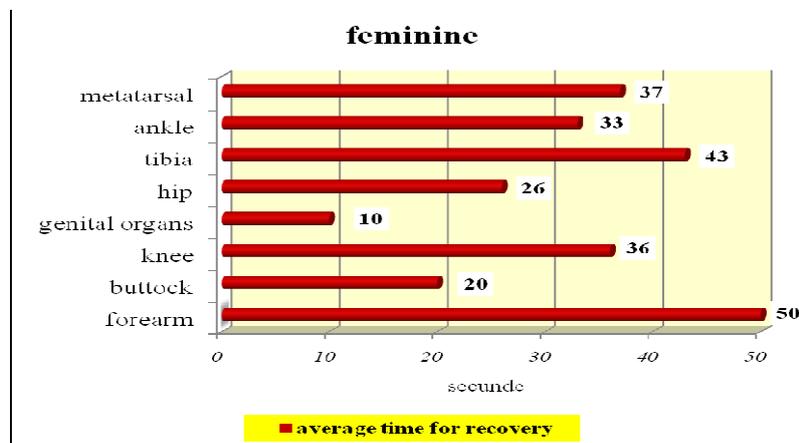


Figure 3. Represents the time needed for injury recovery for females, for different segments

From figure 2 and 3 it can be noticed that the shortest period of recovery is for soft tissues.

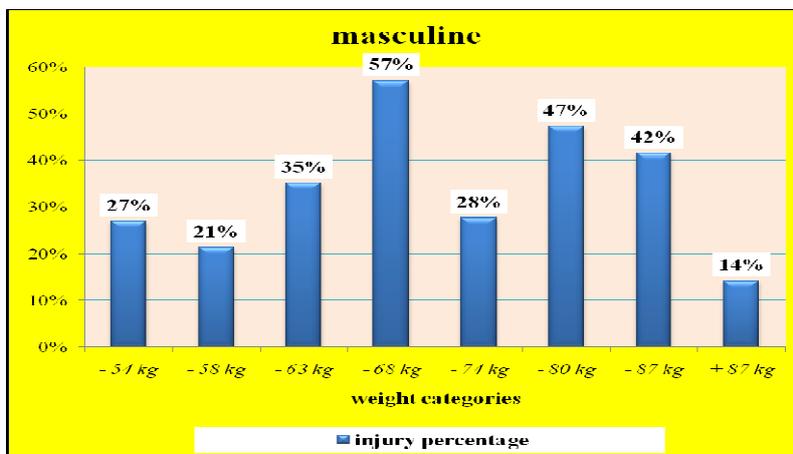


Figure 4. Percentage graphic representation for injuries, on weight categories- masculine

According to the above, the categories with the highest risk are: 68kg where we have force and speed for the execution of technical actions, followed by 80kg and 87kg where the speed of execution decreases and the force increases.

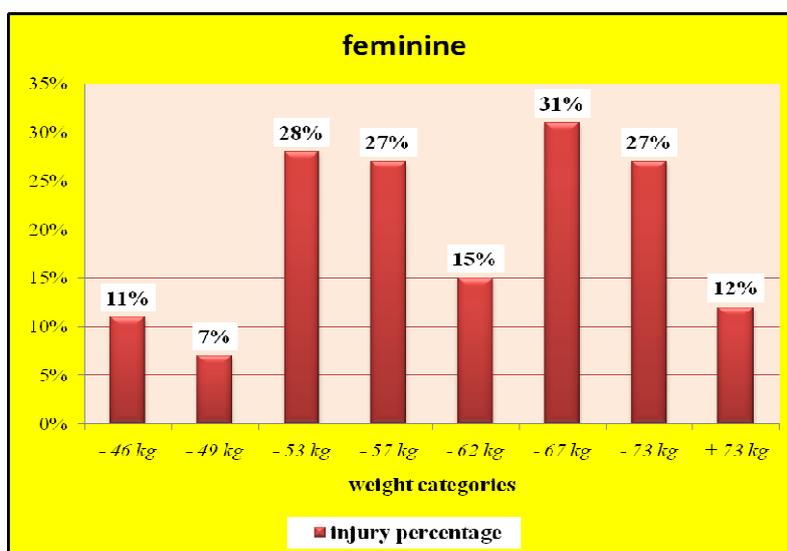


Figure 5. Percentage graphic representation of injuries on weight categories-feminine

In the above graph it can be observed the in feminine categories with a high risk for injury are: 53kg, -57kg, -67kg and -73kg.

Discussion

Taking into account the data presented above, we can propose the following protocol for injury recovery between games:

In the acute stage, immediately after the accident, for the protection of the articulation, of the segment or of the injured part we recommend rest,

ice, compression bandage, anti-declivitous positioning. The purpose is to reduce the inflammation and the pain. A period of rest is necessary, according to the severity of the injury, in waiting for the next game in qualifications, semi-finals or finals.

In the sub-acute phase, the purposes are to reduce the inflammation and the pain, but here appear new objectives like progressively loading the articulation and use of the segment. This is the period for collagen fibers proliferation. Too much stress on the ligaments in this point could have as a result a weak tissue (6).

The recovery phase, between games (in average 1,5-2h), is concentrated on improving the force and the muscular resistance, balance recovery, the proprioception with articulation loading. During this curing phase, the controlled straightening of the muscles and the articulation mobilization will allow a normal orientation of the collagen fibers, parallel with the stress lines. The repeating of the exercises in this period will determine a higher mechanical resistance of the ligaments.

The recovery protocol consists in three phases, each having well determined objectives:

Phase 1: Immediate pain decrease. Minor injury: 9-55 sec.; minor injuries (over 60 sec.): abandon/KO.

The objectives in this phase are: edema and pain reduction; protection against re-injury; maintaining the appropriate body weight.

Phase 2: returning to the activity (functional recovery); minor injury: 9-55 de sec.; minor injury (over 60 sec.): abandon/KO

The objectives in this phase are: partial/complete regaining of the articular stability; partial/complete regaining of the injured segment; normal articulation biomechanics.

Therapeutic exercises: progressive continuance of the exercises for amplitude and stability; specific exercises from martial arts for muscular invigoration.

Returning to competitions: returning and continuing the game in a certain amount of time (1 minute); when the injured segment can be loaded with the body weight and specific check-up exercises can be done, the athlete can safely continue the game.

When the previous activity in completely tolerated, the game can continue.

Phase 3: Prophylactic

The objective in this phase is: re-injury prevention (by changing the guard, the attack leg, the technical-tactical actions, etc).

During the recovery protocol the following can be used:

Gel type - this helps a quick and efficient reduction of the pain and inflammation caused by injuries of the soft tissue or articulation, stimulating own anti-inflammatory and healing processes. They also diminish the muscular tension and contribute to the recovery after effort. A visible gel layer is applied on the affected zone, at intervals of 2-4 hours (between games) (5). The ingredients have the effect of heating the skin and the soft tissue, as well as activating the blood circulation. The effect appears after one hour from its application. The treatment reduces the muscular tension and activates the blood circulation. Also, it prevents the muscular stretching and tearing resulted from sustained effort during the competitions.

Compress type - the instant cold compress is an excellent first aid treatment and a remedy for treating muscle stretching and wounds. The treatment diminishes the pain and helps the healing.

Treatment time - 30min (between the games). Cold compresses diminish the pain and the inflammation caused by lesions, wounds or stretching, and the hot ones are recommended for muscles pain and tension.

Spray type- this makes the treated zone very cold and immediately reduces the pain caused by injuries of the soft tissue, stretching, luxation and tearing. The cooling effect starts immediately after spraying and last for approximately 15 minutes (a fight usually last for 8 minutes). It reduces the pain and the inflammation after hits, stretching and cricks, acting for a long time.

Cream type - the cream reduces the articulation pain and inflammation. The glucosamine sulphate, MSM and the chondroitin are among the product's ingredients and they enhance its effect. It is used for the articulations with problems 2-3 a day on the competition day. It is mandatory to avoid the contact with open wounds, eyes and mucous membranes and it is used externally.

Conclusion

Along with the sports performance increase, performances due to knowledge from different science fields entered the training science and the number of injuries increased. Due to these and due to the rules imposed by the International Olympic Committee, the World Taekwondo Federation always brings modifications and improvements to the protection equipment in

order to insure a more efficient protection of the athletes during training and during competitions. The functional rehabilitation, insured by physical-therapeutic products, represents the most efficient method of treatment for the minor injuries because they permit the continuance of the activity during the game, after a short period of time, for partial recovery as well as for total recovery.

The average time needed for the recovery for males is 31 seconds and for females in 34 seconds, for a recovery that allows the continuance of the fight. During the competition the injuries were registered in 33% for males and 21% for females.

In conclusion, we can say that, from the point of view of registering some weight categories that are more exposed the injury risk, for males the most exposed are: -68kg, -80kg, and -87kg and for females -53kg, 57kg, 67kg and 73kg.

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