

**ABSTRACT OF THE DOCTORAL  
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*THESIS TITLE:*  
**COMMON SPORTS INJURIES FOR TAEKWONDO  
PLAYERS IN PALESTINE**

***Key words:*** injuries, types, localization, prevention, rehabilitation

Deeply ingrained in the oriental philosophies, the martial arts are not mystical creations and they highly depend on each body's training to move according to common physiological principles. With the time passing, the rules and the ranking systems of the martial arts spread throughout the world, and the changes of the society have led also to changes inside the martial arts systems; some not so relevant aspects have been left back, while other new characteristics appeared as a consequence of adapting to the new society's requirements.

The need for this study was driven by the large number of injuries occurred in athletes Palestinian taekwondo practitioners. We aimed to identify the most common types of injuries, the most common places where it is produced and the causes that generates the lesions amongst the Taekwondo players in Palestine. The lack of studies in this area, studies to be tailored exclusively for taekwondo athletes in Palestine, is the motivation for choosing this study; we intend to provide this experiment to the Palestinian Federation of Taekwondo and subsequently may become useful for specialists in this area.

From my experience as a member of the National Taekwondo Palestinian team, as an athlete and Taekwondo coach as well, due to the development of taekwondo sport in Palestine, we considered important in this experiment to raise the awareness, from the **scientific point of view**, both for the athletes and the coaches, towards knowing the specific taekwondo injuries and their causes, in order to enhance athlete's performance and the quality for competitions.

In the **first part**, "Theoretical and methodological basis of the assignment", we presented the general concepts related to this sport-specific injuries.

**Part II** – “Preliminary issues of the research” aimed to highlight the importance of the physical therapy in the post surgical recovery, in the case of the anterior cruciate ligament rupture, to design a suitable prevention and rehabilitation program for lower limb taekwondo injuries, using physical education means and another program for ACL rehabilitation injuries.

**Part III** – “Personal contributions”, on the questionnaire basis, highlighted, as **study objectives**, the most common types of injuries and their causes, their location on the body depending the criterion of "weight", "age", "height", "color belt"; attempted to determine whether there are significant differences between types of sports injuries and their location according to the severity of injury, the timing - during training or competition and the location on the body (upper and lower). The findings of this study can be generalized to consider Palestinian taekwondo practitioners, conclusions will be provided to the Palestinian Taekwondo Federation and the Ministry of Youth in Palestine, along with our recommendations. Making other further studies in the line drawn by this paper, and not only this line, is a necessity.

**Tasks of the study** have consisted of compiling the questionnaire, analysing the data, discussing the results, suggesting general and particular solutions for injury management for the Palestinian taekwondo players.

### **The main hypothesis**

*There are significant statistical differences between the types of injuries and the causes of it for the practitioners of taekwondo from Palestine, also depending on the weight category variable, age, height and belt degree variable.*

### **Secondary hypothesis:**

*There are statistically significant differences between the types of sports injuries and their localization depending on the severity of the injury, time of the occurrence and body part (upper or lower).*

### **Steps being carried out**

The study was divided into three steps:

- first step, between 15.10.2013 – 10.03.2014:
  - establishing the theoretical and practical problems of the study;
  - deepening of theoretical knowledge about the subject that I approached;
  - familiarity with the peculiarities related to age and sex of taekwondo players;
- second stage, between 11.03.2014 – 25.05.2014:
  - addressing Palestinian Taekwondo Federation affiliated clubs;
  - establishing the lot and sample work;
  - composition of the questionnaire;
  - analysis of results;
- third stage, between 26.05.2014 – 02.10.2014 :

- personal contributions;
- conclusions and suggestions;
- writing the present work in order to be offered to the Palestinian Federation of Taekwondo

We have distributed 230 forms (in total) but not all of them were appropriate for statistical analysis. After collecting the information, it was analyzed using the software programme SPSS (Statistical Package for Social Sciences) and Microsoft Excel, and by applying the following operations: arithmetic average, standard deviation, median line, frequencies, percentages, chi-square value, used in order to determine whether there is a significant difference between the expected frequencies and the observed frequencies in the criteria that we have chosen, Cronbach Alpha ( $\alpha$ ), T-test and One Way ANOVA test.

**The sample:**

The sample was selected randomly and consisted of 110 players who obtained a black belt and above and 90 athletes with coloured belt, officially registered within the Palestinian Federation of Taekwondo.

**Table 1. Personal information**

Variable	category	n	%
Weight class	< 66 kg	108	54.0
	>= 66 kg	92	46.0
	Total	200	100
Age	Seniors	63	31.5
	Juniors	137	68.5
	total	200	100
Height	< 172 cm	121	60.5
	>= 172 cm	79	39.5
	total	200	100
Belt	black	75	37.5
	others	125	62.5
	Total	200	100
Injury time	Training	106	53.0
	Competition	94	47.0
	Total	200	100
Injury severity	mild	54	27.0
	Moderate	84	42.0
	Severe	62	31.0
	total	200	100

**Table 2. Standard deviation for weight, age and height**

Variable	m	sd
Weight	64.90	15.32
Age	20.64	5.29
Height	169.50	12.82

As table 2 indicates, the average weight was  $64.90 \pm 15.32$ , while the

average age was  $20.64 \pm 5.29$  and the average height was  $169.50 \pm 12.82$ .

### Methodology

We used:

- literature review;
- anthropometric measurement method - in order to determine specific features, we performed anthropometric measurements that targeted height and weight;
- questionnaire survey method - the descriptive approach it fits and fulfills the nature of this study, being one of the basic approaches in conducting such type of research. To ascertain the validity of the study tool, its contents were approved by qualified and expert people in the field of study. Magali, Hashim Ibrahim and Walid Rahahleh, all of them being university professors, validated the study tool.
- we used the compared pedagogical experiment, thus establishing the existing level of the sample at the start of the experiment, in the end of the experiment and the differences between, validating or invalidating the initial hypotheses.
- and the graphical method - in order to ensure an intuitive support in presenting the measurements and the results, we used histogram.

### Results review

**Table 3. Frequencies and percentages of the types of injuries among Taekwondo athletes in Palestine based on weight variable**

Type	Weight Category				Total		chi-squar e	Level of signf.
	Below than 66 kg		66 kg and above		Freqv.	%		
	Fr	%	Fr	%				
Bone fracture	70	6.8	85	8.2	155	15.0	1.28	0.257
Tendons Rupture	6	0.6	4	0.4	10	1.0	0.42	0.515
Torn muscles	41	4.0	15	1.5	56	5.4	12.38	0.000
Ligaments Rupture	51	4.9	29	2.8	80	7.8	6.31	0.012
Dislocation	20	1.9	14	1.4	34	3.3	1.13	0.288
Sarcopenia	4	0.4	2	0.2	6	0.6	0.69	0.406
Bone Bruises	114	11.0	158	15.3	272	26.4	6.62	0.010
Muscle Bruises	53	5.1	73	7.1	126	12.2	2.95	0.086
Nerve Bruises	10	1.0	7	0.7	17	1.6	0.56	0.452
Wounds and scratches	82	7.9	67	6.5	149	14.4	1.69	0.194
Contractions	28	2.7	61	5.9	89	8.6	11.86	0.001
Sprains	34	3.3	4	0.4	38	3.7	24.04	0.000
<b>Total</b>	<b>513</b>	<b>49.7</b>	<b>519</b>	<b>50.3</b>	<b>1032</b>	<b>100.0</b>		

**Table 4. Frequencies and percentages of the types of injuries among Taekwondo athletes in Palestine based on weight variable**

Type	Weight Category				Total		chi-square	Level of significance
	Below than 66 kg		66 kg and above		Freqv.	%		
	Fr	%	Fr	%				
Head	55	5.3	47	4.6	102	9.9	0.72	0.395
Brow	0	0.0	0	0.0	0	0.0	-	-
Eye	21	2.0	18	1.7	39	3.8	0.27	0.605
Nose	4	0.4	7	0.7	11	1.1	0.78	0.376
Lips	10	1.0	0	0.0	10	1.0	10.12	0.001
Neck	22	2.1	28	2.7	50	4.8	0.65	0.419
Shoulder joint	57	5.5	51	4.9	108	10.5	0.41	0.524
Collarbone	4	0.4	9	0.9	13	1.3	1.87	0.172
Humerus	12	1.2	16	1.6	28	2.7	0.53	0.468
Elbow	16	1.6	25	2.4	41	4.0	1.87	0.171
Forearm	4	0.4	2	0.2	6	0.6	0.69	0.406
Wrist joint	18	1.7	22	2.1	40	3.9	0.35	0.551
Metatarsal	5	0.5	7	0.7	12	1.2	0.31	0.577
Phalanges	0	0.0	0	0.0	0	0.0	-	-
Chest	0	0.0	0	0.0	0	0.0	-	-
Ribs	0	0.0	0	0.0	0	0.0	-	-
Back	5	0.5	0	0.0	5	0.5	5.06	0.025
Abdomen	4	0.4	0	0.0	4	0.4	4.05	0.044
Thoracic spine	0	0.0	0	0.0	0	0.0	-	-
Lumbar	59	5.7	45	4.4	104	10.1	2.05	0.152
Sacral vertebrae	53	5.1	45	4.4	98	9.5	0.75	0.387
Pelvis	9	0.9	4	0.4	13	1.3	1.98	0.159
Genital	0	0.0	0	0.0	0	0.0	-	-
Hip joint	2	0.2	0	0.0	2	0.2	2.02	0.155
Thigh	0	0.0	4	0.4	4	0.4	3.95	0.047
Knee joint	2	0.2	2	0.2	4	0.4	0.00	0.991
Cartilage	33	3.2	53	5.1	86	8.3	4.42	0.035
Leg	56	5.4	50	4.8	106	10.3	0.41	0.520
Ankle	15	1.5	32	3.1	47	4.6	5.95	0.015
Phalanges of the foot	47	4.6	52	5.0	99	9.6	0.20	0.657
<b>Total</b>	<b>513</b>	<b>26.7</b>	<b>519</b>	<b>27.8</b>	<b>1032</b>	<b>100.0</b>		

Chi-square value of the spreadsheet was at the 0.05 level = 3.84 = 1 degree of freedom.

The value Chi-square indicates the presence of statistically significant differences in injuries, ruptured muscles value of the significance level was 0.000 and the value of the significance level for ligament ruptures was 0.012, so that these percentages are larger among athletes in the weight category (66 kg and below). The value of the significance level for bruised bones was 0.010 and for contractions the value of the significance level was 0.001, the value of the significance level for sprains was 0.000, so that these percentages

are the largest among 66 kg and above weight category.

We explained these results by the fact that athletes in the weight category 66 kg or less rely more on the offensive complicated techniques or on repeatedly blows, given quickly, one after the other - this requires that they increase their strength and surprise-movements in order to approach the opponent, so that, in many cases, they can even get a torn muscle or joint dislocation. A complicated technique involves a rigorous warm-up program and special abilities of the athlete.

We believe that athletes from more than 66kg category do not need the element of surprise, because they have more power and usually attack from position, with explosive power and moving slower – therefore, often, they lean their entire torso weight on one leg, being more exposed to bone injuries, cramps or sprains.

In a study, conducted in november 2013, we aimed to identify the most frequent body areas exposed to injury to Palestinian and Jordanian taekwondo players and the injury types for the taekwondo athletes in Jordan and Palestine. The sample was selected randomly and consisted of 55 players among those who obtained a black belt and who are officially registered in the Palestinian (25 players) and Jordanian (30 players) Federations of Taekwondo.

**Results:** fractions are the most frequent injuries (17.8 %) among the Jordanian players, while they have a larger percentage (20.7 %) among Palestinian players. It is to be noted that the total number of injuries to the Jordanian athletes is of 45 injuries, while the Palestinian athletes have accumulated 87.

Cartilage tears are the most frequent injuries (17.8%) among the Jordanian players while chest cervical injuries have a larger percentage of 18.4 % among Palestinian players. It is to be noted that the total number of injuries to the Jordanian athletes is of 45 injuries, while the Palestinian athletes have accumulated 87.

### **Conclusions**

Palestinian athletes's experience is lower than the one of the Jordanian athletes because, in Jordan, taekwondo is a sport much more common than in Palestine. Therefore, more competition, better results and less injuries for the Jordanian athletes. We noticed many similarities in skill and method of combating between the athletes of the two countries, but Palestinian players have less care and attention than the Jordanians, for both training and facilities of the game.

We recommend, first, to cope with the modern training styles and methods in order to decrease the number of injuries among the Palestinian players. Also, there is the need to implement the playing rules of the game. Punishments should be inflicted on the players who make deliberate faults and mistakes. The practicing athletes should be encouraged to use a complete taekwondo protective equipment, in conjunction with the tightening of the protective rules.

*Heavy bag and weight ankle, for taekwondo training, are some of the most common instruments used by the practicing athletes. But the wrong techniques and training methods, the misuse of the heavy bag and weight ankle lead to an increased number of injuries. In another study, we analyzed the effect of using heavy bag and weight ankle in taekwondo training, for male and female, considering weight and color belt.*

The population of the study consists of 20 Taekwondo Players in Palestine.

Table 5. Descriptive sample of the demographic variables of the study

<b>No</b>	<b>Variables</b>	<b>Categorization</b>	<b>Frequency</b>	<b>Percent</b>
<b>1</b>	<b>Gender</b>	Male	<b>12</b>	<b>60.0</b>
		Female	<b>8</b>	<b>40.0</b>
<b>Total</b>			<b>20</b>	<b>100%</b>
<b>2</b>	<b>Wight</b>	60- less	<b>6</b>	<b>30.0</b>
		61-70 Kg	<b>6</b>	<b>30.0</b>
		71-80 Kg	<b>6</b>	<b>30.0</b>
		80 - more	<b>2</b>	<b>10.0</b>
<b>Total</b>			<b>20</b>	<b>100%</b>
<b>3</b>	<b>Belt Color</b>	Yellow	<b>2</b>	<b>10.0</b>
		Red	<b>5</b>	<b>50.0</b>
		Brown	<b>10</b>	<b>25.0</b>
		Black	<b>3</b>	<b>15.0</b>
<b>Total</b>			<b>20</b>	<b>100%</b>

### *Study Tools and Data Collection*

The current study consists of two aspects, theoretical and practical. In the theoretical aspect, we relied on the scientific studies. Whereas in the practical aspect, we relied on descriptive and analytical methods using the practical manner to collect, analyze data and test hypotheses. The data collection, manners of analysis and programs we used are based on a questionnaire that we have designed to reflect the study objectives and questions.

### **Study Tool Reliability**

To calculate the stability of an instrument study, we used the equation of internal consistency using test Cronbach's alpha of Cronbach alpha for all Statements of the study and identification of generally higher (60%) which is acceptable in the research and studies and gives the questionnaire as a whole the reliability coefficient ranged between (73.1-72.5.8%).

### **Results analysis**

The main results are: the effect of using heavy bag and weight ankle in lower limb taekwondo training was on ankle fracture (4.21), weaken the ligaments around the knee, muscle weakness, numbness of the lower limbs. The importance of effect was in the high level about this points.

There were significant differences in level of effect of using heavy bag and weight ankle in lower limb taekwondo training due to gender and the variance was in favor for female (4.05).

There were significant differences level of effect of using heavy bag and weight ankle in lower limb taekwondo training due to weight of the player and the differences was in favor for those who weight (60) and less and there is no significant differences level of effect of using heavy bag and weight ankle in lower limb taekwondo training due to belt color.

## FINAL CONCLUSIONS AND RECOMMENDATIONS

*In our study, the means used were accessible and the instruments were valid, thus the results we have obtained are plausible and in conjunction with research hypothesis, hypothesis that have been validated.*

In the light of the objectives of the study and the results that have been reached, we can conclude that:

- There were dramatically a lot of injuries among Taekwondo players in Palestine that led to the importance of the survey and study of the subject.
- Most common types of injuries has represented of bone bruises then bone fractures, and then cuts and abrasions.
- Most common parts represented by leg then lumbar spine and then the head.
- Most important reasons behind injuries were because of the lack of adhering to safety and security factors, followed by poor preparation then lack of skill and finally lack of players good behavior.
- The presence of statistically significant differences in some of the injuries is common among Taekwondo players in Palestine linked with some variables such as weight, age, height, degree of the belt, time of the injury and body part injury in addition to the presence of statistically significant differences depending on the severity of the injury case.
- Most of the injuries suffered by Taekwondo players are of medium severity.
- Most of the injuries among Taekwondo players in Palestine occur during the training period.
- The upper part of the body is more vulnerable to injury compared to the lower part injuries.

**We recommend** working on reducing the prevalence of these injuries among Taekwondo players in all various means and methods (i.e, through the work of educational lectures for players and coaches alike, as well as the



distribution of special leaflets shows to the importance of avoiding and minimizing injuries and others).

Also, the importance of providing tools and proper sport wear of taekwondo game and force players to wear them and provide the right tools to the centers during the training period. Paying attention to brief the players on how to avoid injuries by explaining their causes is also important - more than 50% of injuries are preventable if the players and the coaches would pay more attention to prevent dangerous situations and if they include, in training sessions, various forms of stretching exercises:

Coaches should focus training stimuli on the aerobic system, at least during the competitive phase of the training periodization. Massage should be performed by a specialist regularly and whenever it is deemed necessary. Also, psychological counseling should be done for the athletes who have suffered lesions, regardless of their severity.

### **Novelty elements**

From our research, it appears that this study is the first study for these criteria (weight, age, height, belt, injury timing and injury severity), for the taekwondo athletes in Palestine.

We also sought to bring to the attention of coaches and trainers, the importance, from scientific point of view, of including **the plyometric exercises, using weights and machines**, during the workout period.

It is the first study, according to our knowledge, that examines the importance of physical therapy in recovery for the Palestinian female athletes who suffered ACL rupture.

And it is the first comparative study conducted on athletes - Palestinians, a study in which, in our case, we emphasized the shortcomings of the Palestinian team versus the Jordanian taekwondo team.

We intend to provide the results of this research to the Palestinian Federation of Taekwondo, Faculty of Sport, specialists, coaches and athletes, with the mention that, conducting other researches in this field, on different periods, in order to strengthen these results and update the subject of Taekwondo players injuries continuously, is imperative.