

## The rate of prevalence and causes of sport injuries in elite males Pankration players

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**Abstract: Objective:** The purpose of this study was to determine the rate of prevalence and causes of sport injuries in elite males Pankration players in the national team. **Methods:** To this end 28 men pankration with mean age  $23.6 \pm 3.1$  years, weight  $78.4 \pm 7.4$  kg,  $179.7 \pm 3.5$  cm, and the sport experience  $10.3 \pm 2.9$  years, participated in this study. The subjects had several phases of choice to the final stages of camp were invited and ready to attend the World Pankration Championships in Bulgaria (2010). The data in this study was based on three different close questionnaires; the first part of the personal characteristics, championship records and experiments, the second part was related to pankration performers sport injuries including strain, sprain, bone and skin and the third section consisted of the probable reasons of injuries occurrence, preparation test, first aids types, action after injury, rehabilitation and type of injury in the injured limb. Each sportsman should mark the number of his injuries during a year in the related columns. Descriptive and inferential statistical methods (chi-square test) were used in data analysis. **Results:** The results showed that muscular injuries (48.7%) were significantly more than other injuries ( $\chi^2=139.6$ ,  $p=0.012$ ). Also, injuries in lower limb organic (39%) were significantly more than other body parts ( $\chi^2=119.5$ ,  $p=0.02$ ). Moreover, the results showed that the most injuries included trauma (29.2%), sprain (13.3%) and muscle contusion (10.6%) ( $\chi^2=211.5$ ,  $p=0.007$ ). Improper warming up (25.9%), injuries per partner (23.5%) and high pressure (21%) were the most injuries reasons. Also, the most important mechanism of injury incidence was related to opponent's kick and punches blow (60.8%), athlete kick and punch (21.5%) and fall down to the ground (17.7%). **Conclusion:** With correction of present rules and regulations, controlling blow, decreasing wrong blow, improving coaches and athletes awareness of the prevailing injuries in this sport, according to the duration of rest to recover energy reserves lost during training and competition, increase muscle strength sport pankration suit, warm up body before practice and competition, along with the use of protective equipment and safety can be more than many in the sport reduce injuries.

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### 1. Introduction

The most important factors in sport medicine are preventing to sport injuries. Sport injuries for who involved before is a destructive experience, but for others is a sudden happening (Zillman 2009).

Vulnerability is probable injuries most sports. These in high-contacted sports are unavoidable. Sport injuries maybe an acute or chronic. Acute injuries are the results of macro trauma and chronic injuries are the results of micro trauma (Pinkham ; Kohn 1991). Macro trauma injuries are the results of direct or indirect sudden trauma which can cause severe sudden injuries, like: strain and sprain, dislocation and bone broken. In all micro trauma injuries are refer to incorrect excessive syndrome act and nowadays is common in children so as in adults. These injuries are causes long- term and long standing difficulties to skeleton muscular recurrent

which as the results of blowing or acute injuries (Javanma 2009).

Pankration is combination of wrestling and boxing sport, which is the main, roots of ancient Olympic. This sport is involved all mental and physical acts, and with regard to psychology also bravery and patient are very important in this sport (Nouzari ; Hashemi 2010; Ashuri et al. 2008).

Although, from peoples' point of view, the martial arts are known as the sport with most contacts and with the highest injuries (Bebary 2009; Nouzari 2010), studies and statistics show converse results. Injuries in the martial arts are reported in some research and based on them; scientific advices are offered to prevent them (Farraee et al. 2007; Javanma 2009; Zillman 2009). Oler et al. (1991) and Bebary (2009) questioned the safety of the martial arts at championship level. On the other hand, Birrer (1996)

five-year study indicates safety of the martial arts. He asserted that it is true in the martial arts, limbs are injured a lot, but most of the injuries are slight. In Zillman (2009) research which is done on the six field combat sports, reported that tai-chi has the least injuries and the pankration has the most injuries.

On the study that Pappas (2007), conducted on three important sports and games- boxing, wrestling, and the martial arts - injuries in the martial arts were less than the two other sports. Some researches has shown that combat sport is more dangerous than the other sports (Jarret et al. 1998; Oler et al. 1991), on the other hand, other researchers were told that the level of injuries in the combat sports are the same as the other sports or even less than the other like: football, basketball and futsal (Porter ; O'Brien 1996; Birrer ; Halbrook 1998). In their extensive study on four popular sports, Tenvergert et al. (1992) concluded that the rate of injuries in the martial arts is less than sports such as football, volleyball and gymnastics. Javanma (2009), with vast researcher on the pankration field states that lower limb have a high level of injuries. Also, he said that performing blowing techniques are causes a high injuries (23). Heiss (1998) states that the main actor which reveals injuries in sports on the whole the lack of want optimum physical fitness and excessive fatigue.

Moayyed ; Khatamsaz (2010), in their research have shown that the injuries which was happen in the pankration sport is dangerous and even may not be compensated. Nouzari ; Hashemi (2010) also in their research have shown that more injuries is happening in training than in the athlete time of competition and prevention is more important.

But in the other research which is done by Javanama (2009) and Farraee et al (2007) have shown that pankration injuries is common, but usually less and slight and pankration is suitable for young.

Thus, according to the different and sometimes conflicting results [Farraee et al. 2007; Javanma 2009; Moayyed ; Khatamsaz 2010; Nouzari ; Hashemi 2010; Zillman 2009) conducted research on the one hand and the number of athletes and combat athletes which interested in participating in the pankration sport on the other hand, in this research we try the rate of prevalence and causes of sport injuries in elite males pankration players were be considered.

## 2. Material and Methods:

### Subjects

28 elite Pankration players at national level, in Pankration national team camp for dispatch members to the top of the world karate championships in Bulgaria (2010) they had average age:  $23.6 \pm 3.1$

years, weight:  $78.4 \pm 7.4$  kg, Height  $179.7 \pm 3.5$  cm, and had  $10.3 \pm 2.9$  years history of pankration playing.

### Sport Injuries Questionnaire

Questionnaire for sports injuries, especially martial arts by the prepared and has been developed was used (Bebary 2009). The questionnaire is comprised of three parts. The first part involves personal information of each athlete including duration of sports activity, the highest rank and place, height, weight, and age. The second part involved the offered tables classified under four type of strain, sprain, bone and skin injury in head and face, torso and spine, and upper and lower limb injuries in which each athlete should check the took place number of his injuries during the last year; And the third part including 11 questions about test preparation, causes of injury, type of first aid, after-injury and rehabilitation actions, in the injured limb.

By presenting at the camp site of the national team and offering related explanation, the researcher contributed the questionnaires among the subjects (champions of Iran's pankration national team), collected the data, and the evaluated it.

### Statistical Methods

To statistical analyze the data, descriptive statistics shown as mean and standard deviation and non parametric statistics (chi- square) were used. Significant level was  $P \leq 0.05$  for all the calculations and all the statistical tests were conducted using SPSS software (Version 16).

## 3. Results

Results of this study showed that in general 94.7% of the elite pankration players had injury in their trainings and matches during the last year and only 5.3% did not have any injury.

The percentage frequency of the injury spread in different parts of the body (Figure 1).

According to the figures, lower limb (39%) comprise the highest rate in injury significantly ( $\chi^2=119.5$ ,  $p=0.02$ ) and head and face has the least rate injury (14.7%), and upper limbs' and torso and vertebral column injuries were 23.7% and 22.6% , respectively.

The percentage of injuries in different body parts of Iran's elite pankration players in senior national team's camp as presented in table 1.

According to the classification of each limb, head and face injury in pankration players was 14.7% and in lower limb was 39%. The most injured part in head and face is cheek, in torso and spine is Ribs, in upper limb are fingers, and in lower limb are knee and Kneecap.

Four fold injury rates are shown in the samples. According to this figure, bony injuries with the least

percentage (10.6%) and muscular injuries with the highest percentage (48.7%) comprise the highest rate of injuries significantly ( $\chi^2=139.6$ ,  $p=0.012$ ), and skin and articulation injuries comprise 14.2% and 26.5% of the total percentage of injuries (Figure 2).

Four fold injury types are divided to different parts and percentage of each injured part is observed. According the table, the most frequent types of injuries are trauma (N=33 and 29.2%), sprain (N=15 and 13.3%) and muscle contusion (N=12 and 10.6%), ( $\chi^2=211.5$ ,  $p=0.007$ ), respectively. In articulation injuries, sprain (13.3%) comprises the highest and meniscus injury (4.4%) comprises the lowest percentage of the injuries. In muscular injuries, trauma (29.2%) and muscle tear (3.5%) comprise the highest and the lowest percentage of the injuries, respectively; In bone injuries, closed fracture (6.2%) and open fracture (1.8%) were the most and the least frequent injuries; And in skin injuries wound and ulcer comprise 8 and 6.2% of the total percentage of injury (Table 2).

Research findings also suggest that some of the factors involved in injuries. By surveying elite pankration champions, it was found that 21.1% of the champions have taken part in the preparation test while 78.9% of them had not taken part in it. To them, 25.9% of the injuries has occurred when the body had not been warm enough, 23.5% has occurred because of the training partner, and 21% of the injuries has occurred as a result of high pressure while training ( $\chi^2=181.6$ ,  $p=0.003$ ). The influence rate of factors involved in occurrence of injuries in elite pankration champions.

The survey on the role of having or not having time for a match (training) on injury occurrence showed that 63.2% of the injuries occurred while training and out of match time, since 36.8% of them occurred in match time.

Results obtained from the survey on the type of first aid offered when an injury occurs demonstrate that in 52.6% of the injuries ice is used, in 21.1% the injured limb is immobile organ, in 10.5% the injured limb is bandaged, and in 15.8% the injured athlete is transferred to therapeutic centers.

The survey on the issue that who has offered the first aid illustrated that the first aid is offered by the doctor (5.2%), the coach (31.6%), the athlete, himself (47.4%), and other people (15.8%), respectively.

A survey was also carried out to ask the subjects about the offered measures after the injury occurrence that showed, reducing the activity (38.6%) and injecting (5.3%) has the highest and lowest percentage of the measures, respectively (Figure 3).

The results obtained from the survey on the offered measures at rehabilitation period shows that measures

offered involved heat therapy (10.5%), physiotherapy (33.3%), therapeutic massage (5.3%), therapeutic exercise (26.3%), aquatic therapy (17.5%), and sauna (7.1%) (Figure 4).

Another survey was also carried out to ask the subjects if they immediately continued their match or training after being injured during the match or training. 61.4% of the athletes' responses were positive and 38.6% were negative. Moreover, 70.2% of these national champions started their sport activity before being improved fully and just 29.8% of them continued their sport activity after complete healing of their injuries.

In addition, finding of the study demonstrated that 49.1% of the elite pankration athletes in senior pankration national team's camp still felt pain, 7.1% had inflation, 17.5% had motion limit in the injured limbs and only 26.3% had not trouble in the injured limb.

Finally, the results obtained from a survey on the issue that what kind of movement caused the injury showed that the injuries occurred by the competitors' kick (27.5%), the competitor's punch (33.3%), falling on the ground (17.7%), the injuries due to the athlete's punch blow (7.8%), and the injuries due to the athlete's kick blow (13.7%).

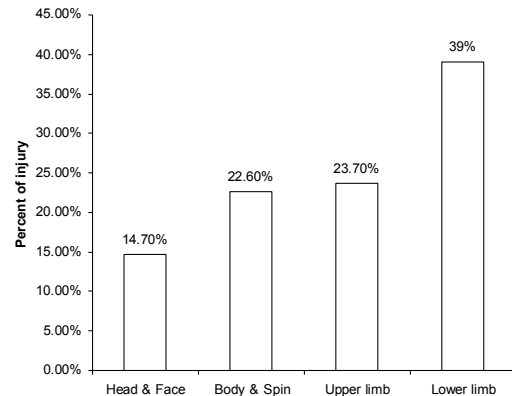


Figure 1: Occurrence of different types of injuries in different body parts of Iran's elite pankration players' in senior national team's camp

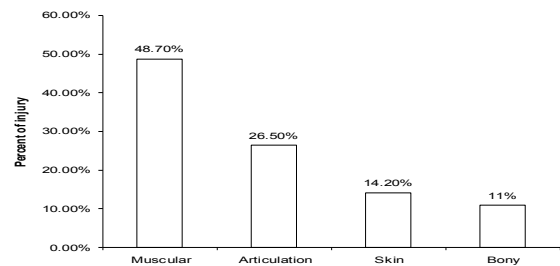


Figure 2: Occurrence of four fold injury types among Iran's elite Pankration players' in senior national team's camp

Table 1: Scattering distribution of injured body parts of Iran's elite pankration players' in senior national team's camp

Limb	Frequency	Percent	Total percentage of each organ	
Head & Face	Cranium (Head)	2	1.1	14.7
	Cheek (Face)	8	4.5	
	Jaw	1	0.6	
	Tooth	2	1.1	
	Nose	5	2.8	
	Gob	3	1.7	
	Eye	3	1.7	
	Ear	2	1.1	
Body & Spine	Neck	4	2.3	22.6
	Back region	4	2.3	
	Loin	7	3.9	
	Ribs	12	6.7	
	Chest	3	1.7	
	Abdominal muscles	1	0.6	
Upper limb	Sides	9	5.1	23.7
	Shoulder	5	2.8	
	Arm	4	2.3	
	Elbow	11	6.2	
	Forearm	3	1.7	
	Wrist	3	1.7	
Lower limb	Fingers	16	9.1	39
	Pelvis	3	1.7	
	Leg	8	4.5	
	Knee & Kneecap	21	11.9	
	Foreleg	9	5.1	
	Ankle	9	5.1	
<b>Total</b>	<b>177</b>	<b>100</b>	<b>100</b>	

Table 2: Occurrence rate of four fold injury types in people classified under the entire body

Injury types	Frequency	Percent	Total percentage of each organ	
Articulation injuries	dislocation	10	8.8	26.5
	sprain	15	13.3	
	Meniscus injury	5	4.4	
Muscular injuries	trauma	33	29.2	48.7
	muscle tear	4	3.5	
	muscle contusion	12	10.6	
Bony injuries	strain	6	5.3	10.6
	open fracture	2	1.8	
	closed fracture	7	6.5	
Skin injuries	Partial fracture	3	2.7	14.2
	wound	9	8	
	ulcer	7	6.2	
<b>Total</b>	<b>113</b>	<b>100</b>	<b>100</b>	

Table 3: Effect rate of factors involved in injury occurrences

Reasons of injury occurrences	Frequency	Percent
Not having primary physical preparation	3	3.7
Not having the body build related to karate	3	3.7
Inappropriate warm up	21	25.9
Not being skillful enough in performing the techniques	0	0
Not using protective equipments	9	11.1
Not having suitable clothing	0	0
Injury by training partner	19	23.5
Not observing immunity factors while training	8	9.9
Unfamiliarity with performing method of techniques	1	1.2
Training over-extension	17	21
<b>Total</b>	<b>81</b>	<b>100</b>

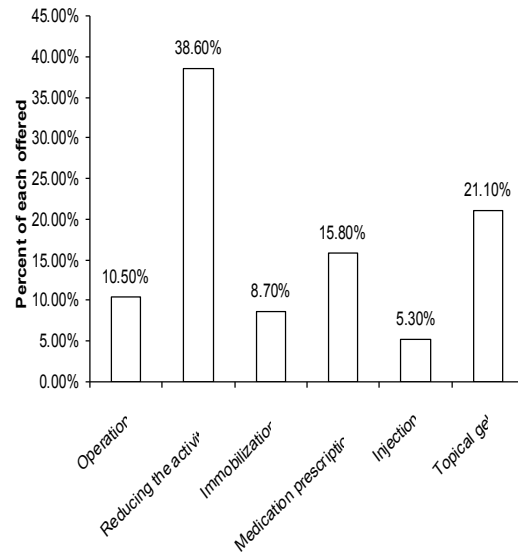


Figure 3: Offered measures after injury occurrence

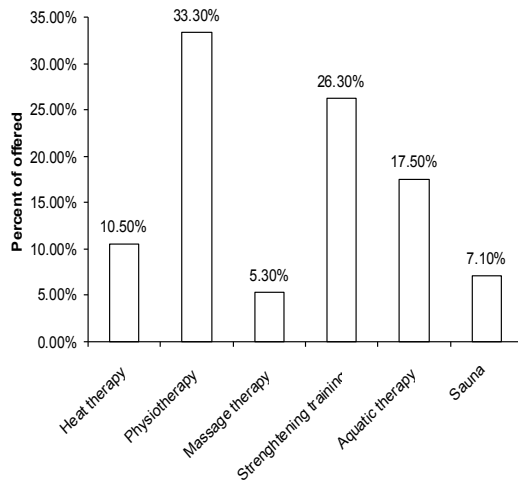


Figure 4: Offered measures in rehabilitation period

#### 4. Discussions

Injuries in sport occur and are one of the common difficulties in championship sports. Analyzing the results of sport injuries in the present study demonstrates that 94.7% of Iran's male pankration players in senior national team's camp that were to be sent to world karate championship in Bulgaria (2010) during last year had injured and just 5.3% had no injury.

In this study, results of the investigation on different vulnerable body parts of Iran's pankration national champions show that rate of occurred injuries in lower limb is more than other parts of the body, significantly. These results are consistent with those of Moayyed ; Khatamsaz (2010), Nouzari ; Hashemi (2010), Javanma (2009), Zillman (2009), Farraee et al. (2007).

In the offered figures of the study and their obtained results, a comparison was made between different type of injuries classified under muscular, articulation, skin and bone. Rate of muscular injuries is higher than other types of injury significantly and trauma (60%) and muscle tear (7.3%) comprised the most and the least frequent type of muscular injuries. This finding is consistent with the result of the previous research (Moayyed ; Khatamsaz 2010, Nouzari ; Hashemi 2010, Javanma 2009, Zillman 2009, Farraee et al. 2007). As such, high percentage of muscular injuries suggest that muscular system plays a main and crucial role in all sports particularly pankration in which muscular system is in danger of being injured more than the other parts since pankration involves regular contacts, clash of punch and kick, using pressure to take in order to deviate and fall each other on the ground (mat) during exercise and match. Therefore, the important role of a desired and systematic physical preparation in muscular system should be particularly addressed.

Results of this research deals with some factors that influence the occurrence of injuries in elite pankration players in this field. The obtained results show that 25.9% of the injuries occurred Inappropriate warm up, so coaches' and athletes' attention and care should be attracted to this important point that athletes should warm their whole bodies up systematically before exercise and match. In this regard, Alter (1996) asserted that warm up along with stretch movement before sport activities cause reduction of many injuries while performing the technique. Hergenroeder (1998) offered strategies to reduce sport injuries that warming up and cooling down body by using PNF stretch movements can cause 75% reduction in occurrence of sport injuries and even reduce 80% of medical expenses. Therefore, teaching true methods of warm up to athletes and increased attention of coaches to this

issue plays a crucial role in reduction and prevention of sport injuries (Nouzari 2010).

Injury by training partner and under training over-exertion are other reasons involved in occurrence of injuries in pankration national champions that comprise 23.5% and 21% of the injuries. As a result, athletes should try to make the best use of a technical and appropriate training partner during training condition, because the finding of research show that 63.2% of the injuries occurred not during match (training). And this result is consistent with the results of Nouzari ; Hashemi (2010), Javanma (2009) and Charles et al. (2000) study. Thus, during performance of training, technical and tactical programs, coaches should have more care and supervision on athletes' training procedure and engage in offering strategies that reduce injuries while training. Also, over-exertion is an effect factor and coach's attention should be attracted to this issue that they should try their best to stop training in case of excessive fatigue. Research conducted by Routley ; Valuri (1993), Heiss (1998), and Charles et al. (2000) showed that training over-exertion and excessive fatigue is the most important cause of sport injuries.

Another noticeable point of this research was offering 47.4% of first aid by the injured athlete and 15.8% by people other than coaches or doctors that can be involved in their further injury. And this rate corresponds to the almost the same rate presented in Moayyed ; Khatamsaz (2010) and Nouzari (2010) research.

Lack of involvement of 78.9% of the athletes in preparation test and return of 70.2% of them to training and match before complete improvement is very effective on occurrence of further injuries and 49.1% of them still felt pain, 17.5% influenced by motion limit and 7.1% had inflation in their injured limbs.

Moreover, the results illustrated that competitor's kick and punch blow, and falling on the ground comprised 78.5% of the injuries. These results are consistent with those of Moayyed ; Khatamsaz (2010), Javanma (2009), Zillman (2009), Farraee et al. (2007).

The finding of this study can conclude that due to the high level of injuries in the lower limbs (39%) and blowing firmly tap to these area, in parkration, it seems to athletes try to scare and eliminate opponents focus from direct blow to lower limb. Therefore, error factor form the opponents also shown that delinquent athlete doesn't adhere to the sport regulation and sportsmanship and in this regard also athletes should be teach in their training.

Unlike people's idea that view martial arts as a violent, contacted sport with lots of injuries, the

comparison made between this sport and other sports such as football, handball, hockey, gymnastic and wrestling shows lower percentage and intensity of injuries in martial arts. Hence, it seems that issue of injury in pankration that is among important and popular sports should be addressed by supervisors, responsables, technical managers, coaches and athletes more carefully.

## 5. Conclusion

Considering that the study results showed 94.7% of elite pankration players during training and competition in a kind of last year were injured suffered, lower limb with a 39% most of the damage won, 25.9 and 21 percent of the injuries, respectively, while occurred inappropriate warm up and under training over-exertion, and return 70.2% of conservatives to pankration practice and competition before healing was complete,

In sum, it can be concluded from the results of the study that with correction of present rules and regulations, controlling blow, decreasing wrong blow, improving coaches and athletes awareness of the prevailing injuries in this sport, according to the duration of rest to recover energy reserves lost during training and competition, increase muscle strength sport pankration suit, warm up body before practice and competition, preventing the athlete from return to training and match before being fully healed, along with the use of protective equipment, mental preparedness and safety can be more than many in the sport reduce injuries.

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