

## Determining the Prevalence and Causes of Sport Injuries among Female Volleyball Players of Iran Super League

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Ziba Rahimian Mashhad, Syed Reza Attarzadeh Hosseini, Zahra Hojati, Hossein Soltani: Determining the Prevalence and Causes of Sport Injuries among Female Volleyball Players of Iran Super League

### ABSTRACT

This research was a causative descriptive after incidence with the aim of determining the prevalence and causes of sport injuries among female volleyball players of Iran super league. For this purpose, 118 female volleyball players who were participating in countries first league of Iran volleyball were selected as statistical subjects. They completed sport injuries questioners which its validity was validated by physical education experts and has the reliability of 90%. At the end, the results were analyzed by using descriptive statistics (PFR %) and the median differences were tested by Runs Test;  $P > 0.05$  was considered as non-significant. The highest injuries were tendon-muscles with 76% and the lowest ones were bone injuries with 2.1%. The percent value of relative frequency injuries was in upper extremities with 35.2% and in lower extremities with 33.8%, in trunk and spine with 25% and in head and face with 6%. In this study knee and foot injuries had the highest injuries with 20.7% and head and face had the least proportional frequency percent with 6.5%. Ankle twist had the most relative frequency percent with 64.7% in compared with lower back pain and knee injuries. **Conclusions:** Players and coaches must attend to protective equipments and appropriate warm up for preventing the injuries.

**Key words:** Female Volleyball Players, sports injuries.

### Introduction

Volleyball is one of the favorite international sports. Federation International Volleyball claims it has 800 million participants who play volleyball at least once a week [3]. The amount of injury in volleyball is approximately equal to that of high contact sports. The innate danger of injury in volleyball is due to its dynamic and ballistic nature and the fact that the spike speed may be 145kms. In various studies the most vulnerable areas in volleyballist have been found to be different. As Schafle & et al (1990) have reported the upper limbs injuries amount to 20 percent of all injuries [15]. Ankle (17.6%) waist (14.2%) and knee (11%) have been the most popular areas of injury. In another research in Helsinki University dental injuries and fractures have been reported as the least frequent injuries [10]. Knobloch & et.al stated that upper limbs had the most kinds of injuries [9]. In a research in Switzerland University it was found that half of injuries engaged lower limbs and 24% of injuries had affected head and neck [8]. However according to the most of the conducted researches, ankle, knee and

fingers are the most sensitive areas for injury of volleyball. Some researchers have reported ankle sprain as the main (primary) injury in volleyball [8]. Reeser also reported that volleyballists commonly have the most risk of injuries in ankle and over use of knee and shoulder [14]. Regarding this Verhagen's research showed generally prevalence of injuries was 2.6 injuries per 1000 hours of volleyball playing and the prevalence of severe injuries was 2 injuries per 100 hours of playing from which ankle sprain (41 cases) was the major server injury. Of course 31 persons (75%) had previous ankle sprain [21]. In another study it was reported that ankle sprain is the commonest server injury in volleyball [18]. Morphy, Connolley and Beynnon suggested high level of skill may increase the incidence of ankle sprain [12]. A large number of volleyball injuries which occur in the lower limbs can be specifically in the knee joint that are very vulnerable [11]. Knee injuries are of high specific importance, because these injuries make athletes absent more hours in comparison to injuries in other areas [16]. Ankle and knee injuries are due to individuals jumping during serve spike and defend. According to Newton rule; the higher

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jump the more kinetic energy which should be absorbed correctly to prevent injury [20]. Adrian & Laughlin believe that descents often lead to force production about 5 times of body weight. Jump - descents sequences are the most common source of injury in volleyball. In fact defend and spikes involve 70% of all injuries in volleyball [22].

Regarding overuse injuries in limbs there are different reports. It has been mentioned in one study that most injuries in volleyball are due to limb overuse that bring about 50% to 70% of injuries [17]. Ferretti and colleagues also observed that more than 40% of high level players undergo (sustain) knee injuries that are caused by knee and shoulder overuses during playing [5]. With respect to mentioned cases and lack of a wholesome agreement and also contradictory ideas, and the necessity of a time based and place based research which can reinforce the preventive strategies based upon logical recognition of injuries, the research have conducted the present research.

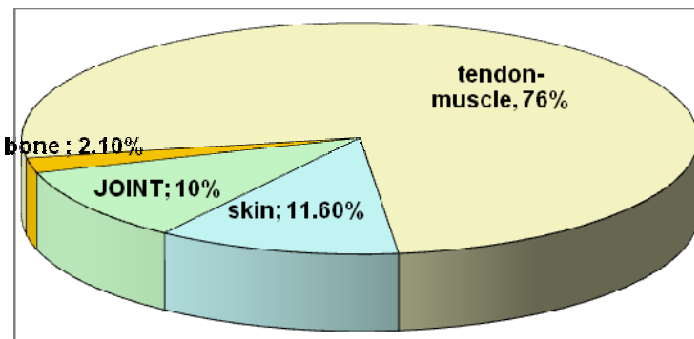
*Research Methodology:*

Method of this research is descriptive - casual after incidence. Statistical sample included 118 female volleybalists from universities throughout Iran participating in volleyball championship tournaments of universities with average age of 22.5 years.

Instrument used in this research was sport injury questionnaire whose validity was ascertained previously by six physical education experts and sport physicians. Cronbach's alpha Coefficient was measured as 90% for this questionnaire. In this questionnaire the volleybalists were asked to consider just one macro cycle (training, match and recovery period) during the last year and then answer the questions explicitly. Finally for data description and data analysis, descriptive statistics and median test were applied and significance level was considered at  $p < 0.05$ .

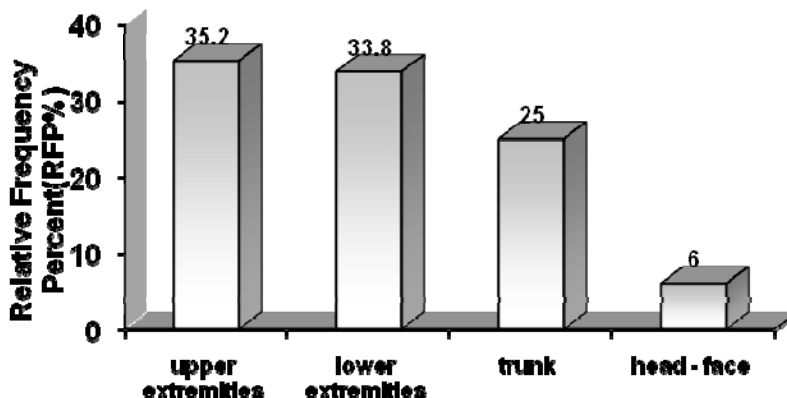
*Results:*

Among all types of injuries, tendon - muscle injuries (76%) and bone injuries (2.1%) had respectively the most relative frequency percent and the least relative frequency percent [Figure 1].



**Fig. 1:** The relative frequency percent of injuries types

Upper extremities (32.2%), lower extremities (33.8%), trunk (25%), head and face (6%) were the most injured areas to the least injured areas respectively [Figure 2].



**Fig. 2:** Relative frequency percent of different injured areas

According to table 1 skin injuries in upper extremities, joint injuries in lower extremities and bone injuries have been the most common injuries.

Ankle sprain (64.7%) compared with backache and knee injuries had the most frequency. Furthermore average incidence of injury during training was more than average incidence of injury during match, whereas 32.2% of injuries had

occurred in the second half an hour after starting the training.

According to the results of table 2 the most primary causes of sport injuries were reported respectively as following: not doing warm up phase before training, low level of physical fitness, improper performance of skill and ignoring rules and regulations (the least important factor).

**Table 1:** Relative frequency percent for prevalence of injuries types in different parts of body

Types of injuries		Areas				Runs test	
		Upper Extremities	Lower Extremities	Trunk	Head and Face	Z	P- value
Types of injuries	Tendon-Muscles	16.69	21.86	31.78	7.5	-8.37	<sup>†</sup> 0.001
	Joint	17.66	34.47	11.35	.35	-8.66	<sup>†</sup> 0.001
	Skin	33.24	6.07	15.55	21.08	-8.35	<sup>†</sup> 0.001
	Bone	17.97	18.58	5.67	53.57	-8.42	<sup>†</sup> 0.001
	Pain	14.44	19.02	35.65	17.5	-8.37	<sup>†</sup> 0.001
Runs test	Z	-9.41	-9.31	-8.91	-9.64		
	P- value	<sup>†</sup> 0.001	<sup>†</sup> 0.001	<sup>†</sup> 0.001	<sup>†</sup> 0.001		

<sup>†</sup>; The median difference is significant at the P<0.05 level.

**Table 2:** The most important Causes for sport injuries

Causes for sport injuries	Ranks
Not doing warm up phase before training	1
Low level of physical fitness	2
Improper performance of skill	3
Previous injuries	4
Over- training and fatigue	5
Unsuitable sport setting and equipment	6
Psychological traits of the athletes	7
sport nature (contact or non – contact)	8
Not using protective instruments	9
Winning motivation	10
Ignoring rules and regulations	11

### Discussion & Conclusion:

Findings of research indicated that tendon - muscles injuries have the most frequency among female volleybalist subjects. In this respect Cassell reported that sprains and strains all together form 67% of injuries in most volleyball injuries in all ages and in all levels [3]. Findings of research also revealed that upper extremities injuries were higher compared with other parts injuries. Excessive uses of upper extremities joints by Volleybalists and also much external rotation in shoulder girdle during strike movement, serve and spike make the conditions suitable for sprain injuries.

Shoulder and hand- finger injuries are among the upper limbs injuries. Shoulder injuries are frequently overuse injuries which are common in volleyball. These injuries involve 23.6% of injuries in Cassell's review article [3]. Rice and Anderson stated that among higher level players, 75% - 90% of shoulder injuries have been related to over use of limb that have been resulted from tendinitis of the rotator cuff ( impingement syndromes) or biceps muscles tendinitis [3]. It is obvious that main cause for injuries in volleyball are defending or spiking tasks. So it is not wonderful that jumps and descents are main risk factors. During defending, a player is disposed to injury in three specific motor

(movement) areas; ascending, touching the ball and descending. Knees, ankles and back are inclined to injury, because they tolerate a pretty large amount of force. Hand and finger injuries are resulted from hitting the ball and defending it. If these organs have an unsuitable position while hitting or receiving the ball and the velocity of ball is high, the probability of injury will increase. Defender is disposed for injury during descending, because the probability of descending on teammate or player from other team is high. In Watkins ' study hitting the opponent player and hitting teammate were reason of 13 % and 11% of injuries respectively [22]. In this research frequency of ankle sprain compared with backache and knee injuries, was more which was in agreement with Augustson and Reeser's research [1, 14]. It can be concluded that female vollebalists are generally exposed to ankle sprain & knee injuries [4, 13, 18]. Anyway ankle sprain is considered as the most common injury in volleyball. Ankle sprains may be caused by sudden changes in direction which are specific to this sport or lack of physical fitness. Successive jumps influence ankle. Since after jumping and descending a force about 5 times as much of body weight is put on feet and ankle and feet are the first absorbing organs so in the case of an unsuitable descending or descending on one foot which increase the amount of force as much as twice,

this area (ankle) is susceptible to severe injuries. It seems that previous injury is a significant risk factor for ankle sprain [19]. It is recommended for decreasing injuries incidence, athletes' physical fitness components including balance (equilibrium) training should be improved which will reinforce deep receptors of ankle. With respect to the fact that most injuries take place near the volleyball net while descending after defend(63%) or attack(29%), it is suggested to decrease the probability of injury by changing some rules, technical training and use of ankle supporters [2]. Furthermore previous injuries when associated with improper rehabilitation, can be a risk factor for future injuries, so paying attention to proper rehabilitation is a must. For fostering this, proprioception training or balance training can be applied, because weak balance can cause subsequent sprains in ankle [7]. Prospective studies show in order to decrease the incidence of ankle injuries in female athlete's specific plyometric exercises should be used [6]. As mentioned before, the most important causes for sport injuries are not doing warm up before starting exercises, low physical fitness and improper performance of skill. Providing the athletes with these elements is main task of coaches. The primary aim of warm up is increment of body temperature and muscle temperature which increase the elastic strength in Collagen tissues and provide more flexibility in body so that to decrease probability of muscular rapture and tendon sprain and prevent muscular pains. Eventually warm up brings about psychic and spiritual readiness of athlete to tolerate muscle pressures [6]. Appropriate instruction for coaches, wise and correct planning of training programs and improvement of required physical and motor fitness and paying attention to proper instruction of technical skills are of high importance that should be emphasized.

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