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Injuries in Wheelchair Basketball Players

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Abstract

In the literature, information about injury patterns, risk factors and management strategies is limited for wheelchair athletes. The purpose of this study was to determine the prevalence and nature of injuries in wheelchair sports participants. Demographic data, sport history, type, area, cause and story of the injury and barriers of collecting this sport information were recorded. A total of 15 individuals were included in the study. The biggest barrier to play the sport was the cost of the wheelchair. 26.6% of them had injury in the past one year and 75% of them had injuries because of muscle tears. Injuries while playing wheelchair sports are common, and mostly occurred while driving the wheelchair. Mostly their fingers are squeezed and stuck to the wheelchair. Education for prevention of injuries should be given to all the players. Protective equipment for hands should be considered to protect against injuries.

Keywords: Injury, wheelchair, basketball players, wheelchair athletes.

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1. Introduction

In recent years, the importance of sport and physical activity to improve the health and quality of life of individuals with disability and chronic illness has been growing [1]. In individuals with disability, health benefits of regular exercise and sports participation are well detected [2, 4].

Sports activities were developed to revive or rehabilitate individuals with disabilities. The first competition for spinal cord-injured individual, 'Stoke Mandeville Games for the Paralyzed', was held in around 1948. The first wheelchair basketball championship was supported by the University of Illinois in the USA in 1949. The first Paralympics Games took place in Rome, 1960, and involved 400 athletes from 23 countries, competing in eight sports modalities [5].

Wheelchair basketball has been one of the most popular sports in individuals with disabilities in recent decades [6]. Wheelchair basketball is a high-intensity, five players-per-side sport. Before the season, due to having different disabilities, the athletes are classified based on their functional ability to perform movements in basketball [7].

An excessive number of training sessions and competitions with athletes looking for high effectiveness and perfect performances cause an increase in the risk of trauma and sports-related injuries in the competitive sports practice [8]. Injuries while playing sport affect the daily living activities of persons in a wheelchair [9, 10]. Due to the repetitive nature of propulsion, peripheral nerve entrapments, repetitive strain injuries, premature osteoporosis and pressure sores, especially the upper limb injuries are seen mostly in wheelchair sports participants [11], which may also limit sports participation. According to the literature, the risk of sports-related injuries for the population of disabled individuals who practice sports is similar to that observed among non-disabled athletes [12].

In the literature, information about injury patterns, risk factors and management strategies is limited in wheelchair athletes. The aim of this study was to determine the prevalence and nature of injuries in wheelchair sports participants, research rehabilitation practices and injury prevention strategies used, and detect perceived benefits and barriers to participation.

2. Materials and Methods

The subjects included in this study were 15 individuals, 14 male and 1 female. Before the wheelchair basketball game, Iskenderun and Ordu wheelchair basketball team players voluntarily took part in the study.

A questionnaire was applied to the 15 disabled athletes. With demographic information, questions about how many months they play the sport, hours of training, disease, presence of any health professional (doctor, physiotherapist, nurse) when they were training, the reason for playing this sport, problems that make the sport difficult to participate, injury history in the past one year, type of the injury in the past one year, the position at which injuries mostly occur, the most injured part of their body in all of their sport life, prevention strategies for injuries and education for prevention strategies of injuries were collected. There were 34 questionnaires completed.

The Nottingham Health Profile was used to examine the quality of life related with health. This test is a generic health-related quality-of-life measure to evaluate perceived distress across various populations. It consists of 38 yes/no items in six dimensions: pain, physical mobility (PM), emotional reactions (ER), energy level (EL), social isolation (SI) and sleep. Each dimension scores may range from 0 to 100. The reliability and validity of Turkish NHP have been demonstrated [13].

We performed the analyses using the SPSS statistical software. Descriptive measures are summarised as mean \pm SD or percentage. Kruskal Wallis Test was used for differences and Spearman correlation was used for relationship. Probability values of less than 0.05 were considered significant.

3.Results

Of 15 subjects, 14 men and 1 woman ($X \pm SD = 32.35 \pm 5.82$ years) were included in the study. All of them were professionals in the sport. Their scores differed from 1 to 4.5 and median 2.5 point. They were asked how many months they had been in that sport, and it was found to be 160 months. All of them lived in the city centre. Their history of previously participated sport was questioned and it was found that 28.6% had played table tennis, 28.6% football, 7.1% archery and 35.7% did not play any sport. They trained 4 days per week (Table 1).

Table 1. Demographic data of the subjects

		$X \pm SD$
Age (years)		32.35 ± 5.82
How many months you make that sport?		160 ± 73.08
Number of matches (in a year)		22.42 ± 4.08
Hours of training in a week		4.4 ± 1.05
Disease	N	%
Hidrocephali	2	13.3
Poliomyelitis	6	40.0
Paraplegia	4	26.7
Congenital hip protrusion	1	6.7
Amielia	1	6.7
Meningomyelosele	1	6.7

They were asked if they had any health professional (doctor, physiotherapist, nurse) when they were training, and they said that they had no health professional. It was found that while they were in the match, there is one health professional, but they did not know his job. There was no statistical difference between point classified players and injury; 28.6% of them had a break because of their injuries.

They were asked the reason for playing this sport, and most of them said they played this sport to remain healthy and to find friends. The biggest problem which was obstructive to play the sport was the cost of the wheelchair (Table 2).

Table 2. Reason for preferring wheelchair basketball and problems that make the sport difficult to participate

Why you play this sport?	n	%
For friendship	4	26.7
To be healthier	4	26.7
To have a better body	2	13.3
To enjoy	1	6.7
To be active during free time	1	6.7
To find a chance of going outside	1	6.7
To struggle with my disability	2	13.3
Problems that make the sport difficult to participate		
Transportation	5	33.3
The wheelchair cost	9	60
Other financial problems	1	6.7
Family, friends' resistance	0	0

A total of 26.6% of them had had an injury in the past one year and 75% of them had injuries because of muscle tears. Three of them were injured while training and one of them while playing in the match. The position at which injuries mostly occurred was while driving the wheelchair. Mostly, their fingers were squeezed and stuck to the wheelchair. Their upper extremity was injured mostly, because wheelchair basketball sport is made by upper extremity performance. None of them needed to be operated because of the injuries (Table 3).

Table 3. Injury history of the subjects

		<i>n</i>	%
Injury history in the past one year	Had	4	26.6
	Had not	11	74.4
Type of the injury in the past one year	Muscle tear	3	75
	Sprain	1	25
The position at which injuries mostly occur			
Wheelchair driving		10	66.7
Bump		5	33.3
Shooting		0	0
Rotating		0	0
The most injured part in all of your sport life			
Hand		2	13.3
Arm		2	13.3
Forearm		3	20
Shoulder		3	20
Neck		1	6.7
Knee		1	6.7
Never injured		3	20

They were asked what they did as a prevention strategy for injuries, and two of them said they made a cold pack when they felt pain, one of them did warming up and the others did nothing.

Only four of them received education for injury prevention strategies and four of them had to take a break from the sport because of injuries. One of them took a break twice, another took one break and a third took a break thrice.

There was moderate and positive correlation between duration of the sport and Nottingham sleep parameter ($r = 0.489$), and pain ($r = 0.418$). The correlation between duration of the sport and ER, SI, PM and EL was weak. There was weak correlation also between class of the players and Nottingham parameters (Table 4).

Table 4. Nottingham health profile results

Nottingham health profile	$X \pm SD$
Pain	12.58 ± 9.2
Emotional reaction	0 ± 0
Sleep	12.53 ± 12.66
Social isolation	1.29 ± 4.99
Physical mobility	15.49 ± 20.87
Energy level	4.90 12.94

4. Discussion

The present study was planned to examine types, causes for injuries in wheelchair basketball players and to understand player barriers and aim of playing this sport and their health profile. We found injuries mostly occurred while driving the wheelchair. Mostly their fingers were squeezed and stuck to the wheelchair. Their upper extremity was injured mostly, because wheelchair basketball sport involves upper extremity performance and their endurance and strength is not enough for this long and hard sport. Prevention strategies of the injuries reported were only warm-ups and using cold packs in the case of pain. Education of prevention strategies of the injuries should be given to all players. Protective equipment for hands should be considered to protect against injuries.

The biggest barrier of WB was defined as cost of the wheelchairs. They are expensive and the clubs cannot afford the amount for all players. So, most of them had to use old, heavy wheelchairs, which are not suitable for them. Elite wheelchair athletes will generally have well-designed and efficient machines to get them around the track or court. 'The design of the wheelchair can also impact the wheelchair athlete's injury profile. Higher quality competitive wheelchairs that are light and have frictionless moveable components improve the mechanical efficiency of participants. Using a better designed wheelchair can help reduce the risks of injuries' [14]. The other important barriers were the transport of WB players. Because they are mobilised with their wheelchairs, in Hatay (Turkey) buses, roads and pavements are not suitable for disabled people and they often need the help of a relative to transport them in a special car. This causes these people to be dependent on others, and moreover, this transport type is more expensive than the public transport.

For a long time, injuries of athletes are examined in countries that have paralympic athletics. But in Turkey, paralympic games are new so research on paralympic athletes is also very new. In California in 1985, a survey made on paralympic wheelchair athletes. Twelve hundred wheelchair athletes were surveyed to determine commonly experienced athletic injuries. Soft tissue trauma, blisters, lacerations, decubit ulcer and joint disorders were the most commonly reported injuries. Planning the education programme for increasing the performance, while at the same time preventing injuries, will make the athletics more successful [15].

Mateus [16] reported that upper extremity pain occurred more frequently in lower point classified players. But we did not find any difference between the classes. Our study group was small, so this could be the reason we did not find difference between classes.

A survey was mailed to members of the Wheelchair Sports ($n = 71$) and responses were collected anonymously. Fifty-nine per cent of respondents had sustained an injury while playing sport, and the sport in which the most injuries occurred was basketball ($n = 23$ injuries). WB is a hard and fast sport, so injuries are more common here than in other sports. Injury prevention was limited to warming up and stretching before competition, cited by 72% of participants. The possibility of making new friends (76%, $n = 54$) was the reason for participation in WB. The most commonly reported barriers to participation were the traveling distance required for participation (69%, $n = 49$), the cost of sports wheelchairs (63%, $n = 45$) and the availability of adequate participants to form a team (63%, $n = 45$) [17].

In our study, prevention strategies are limited to warming up and using cold packs when having pain. But while we were questioning the players we realised that they did not know so much about preventing strategies; they were thinking for a long time to give a reply, so we gave some examples and they chose an option. None of them had received education about injuries and prevention strategies. All players and directors should receive education about injuries. Players who are injured before were playing in the match without any prevention and this can cause more serious problems. But no one warned the players about this. They stated that they did not receive treatment for their injuries. All the players reported that they have to take health reports once a year, which was the only regularly doctor visit and this visit was made fast and without detailed examinations. So, repetitive injuries increased day by day. In our study, the players reported that they attended WB to be healthy and to find friends. Sport activity for people with disabilities has been developed in order to be

recreative and rehabilitative. By this sport, they find chances of socialising and keeping their body fit. Most of the disabled in Turkey cannot find chances of going out of the house and find friends. They are with their relatives most of the time and are dependent on them both psychologically and physically. Due to sport, they feel freer and stronger.

What causes shoulder muscle imbalances are postural stress, repetitive movement, repetitive microtrauma, lack of core stability and altered neuromuscular efficiency [14]. We found shoulder, forearm and nerve injuries to be more common in WB players.

Fernande *et al.* reported in their study that players' mean training periods were 21 hours weekly in 26 male wheelchair basketball athletes. Their sport practice varied from 2 months to 13 years, with an average of 6.5 years. Pain complaint was present in 54% of these athletes, being mostly localised in the upper limbs (79%). Only 6% of the sample had never had an injury during a game or training [18]. In our study, the players trained an average of only 4.4 hour. According to other players in Turkey, WB players do not train as much as needed. This is because of cost problems, transport problems and maybe the directors' lack of information.

'Biomechanics can play a role in the cause of injuries in wheelchair athletes. Elbow and wrist injuries are predictable in wheelchair athletes based on the biomechanics of the sport. The throwing motion, wheelchair racing, racquet sports, and field events can repetitively stress the hand, wrist, and elbow. This type of repetitive stress can lead to overuse injuries such as muscle-tendon imbalances, strains, and abrasions. Correction of these muscle-tendon imbalances is accomplished by maintaining strength and flexibility of the shoulder, triceps, forearms flexors and extensors' [14].

5. Conclusion

Injuries are common during wheelchair sports, even so prevention strategies are currently used by wheelchair athletes. Wheelchair athletes report a wide range of benefits from participation, including physical and social benefits. Barriers to wheelchair sports participation are primarily related to cost and transportation problems rather than injury frequency. The most injured part is the hands, so protective equipment for hands should be considered to protect against injuries.

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