



Research Article

Injury Rate in Beach Handball – Comparison Between Two Tournaments of the European Beach Tour (EBT)

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Abstract

Beach handball is a team sport, similar to team handball, played on sand. Despite the growing popularity of the sport, there is a lack of scientific studies on injuries in beach handball. The aim of the present study, was to compare the findings from two tournaments of European Beach Tour (EBT), in order to identify injury rates and patterns in this sport. One hundred and twenty-two athletes (50 men and 72 women) in 2014 and 121 athletes (60 men and 61 women) in 2016 replied to a self-reported anonymous questionnaire concerning their injuries while playing beach handball. The overall incidence was 9.7 injuries/1000h of game exposure, and 3.1 injuries/1000h of training. Injuries occurred more often during games (63.6%). Ligament injuries were the most common type of injuries (45.2%), followed by muscle injuries (36.5%). Most injuries occurred in the lower limb (51.5%), while 37.9% occurred in the upper limb. Collision with the opponent was the most common mechanism of injury (44.8%). Female athletes had a higher probability of injuries of small severity (0-1 weeks RtP) than male athletes ($p = 0.009$). Comparison between the two competitions revealed an overall decrease in the injury rate in a statistically significant degree in both genders ($p = 0.002$ for males, $p < 0.001$ for females). **Larger epidemiologic studies will provide us with further information on the injury characteristics of beach handball.**

Keywords: Beach Handball; European Beach Tour; Injuries; Rate

Introduction

Beach handball is a team sport, similar to team handball, but it is played on sand instead of an indoors hall. Handball is a popular sport, especially in central and northern Europe, with an estimated 2 million players involved in it [1]. Around 40,000 players participate in beach handball currently, but its popularity is growing. It has already been included in the Youth Olympic Games in 2018 [2], and in the World Beach Games in 2019 [3]. Despite of the interest of the sports world in beach handball, there is a lack of scientific studies on this sport.

Injuries are a common problem for participants in sports, and science aims not only to treat them appropriately, but also to prevent them by recognising the risk factors for injuries in each sport. This can lead to the development of preventive programs

that can diminish the rate of injuries in each sport. We have already published our findings on the frequency of injuries in beach handball from two tournaments of the European Beach Tour (EBT) finals held in 2014 [4] and 2016 [5]. The aim of the present study was to compare the findings from these two tournaments, so that we can identify the tendencies in time of the injury rate and injury patterns in beach handball.

Materials & Methods

Both tournaments took place in Thessaloniki, Greece. The first one lasted from 30/5/2014 to 1/6/2014, and the second one from 20/5/2016 to 22/5/2016. From the 200 participants in each tournament, 122 (61.0% - 50 men and 72 women) in 2014 and 121 (60.5% - 60 men and 61 women) in 2016 replied to a self-reported anonymous questionnaire concerning their injuries while playing beach handball. The questionnaire included questions on demographics, use of prophylactic equipment and technical training, and information on injuries sustained during the last

24 months. Statistical analysis included Fischer’s exact test and ANOVA analysis where appropriate. It was performed with the use of Microsoft Excel (Office 365, Microsoft, USA) and the statistical package SPSS 21 (IBM, USA). The level of significance used was 0.05.

Results

The demographics of the participants (Table 1) were similar in the two tournaments, except from the age of the male group which was significant higher in the 2014 group ($p = 0.003$). There

was also a statistically significant increase from 2014 to 2016 in the use of prophylactic equipment ($p = 0.003$), but only in the male group. The years of training were also statistically different between the two tournaments in both genders. The training age was significantly lower in the 2016 male group compared to the 2014 male group ($p = 0.03$), while the opposite was true for the female group with a statistically significant increase of the training age ($p = 0.014$) (Table 1).

	EBT 2014		EBT 2016	
	Male	Female	Male	Female
Total Number Of Athletes Participating (N)	200		200	
Participating In Survey (N)	50	72	60	61
Participation Rate In Survey (%)	61%		60.5%	
Age (Years)	29.6	25.9	26.7	26.3
Height (Cm)	185	171	187	170
Weight (Kgs)	87.4	65.1	86.2	65.6
Bmi	25.2	22.3	24.4	22.5
Training Age - Beach Handball (Years)	9.5	4.9	7.5	6.3
Use Of Prophylactic Equipment (%)	20	34.7	50	33.3
Technical Training (%)	80	97.2	90	95

Table 1: Demographics of participants in the survey in the 2014 and in the 2016 tournament.

The differences in the characteristics of the injuries between the 2014 and the 2016 tournaments are analyzed in Table 2 for male players, and in Table 3 for female players. Injuries were statistically significant lower in the 2016 group compared to 2014, regardless of gender ($p = 0.002$ for males, $p < 0.001$ for females). The overall incidence was 9.7 injuries/1000h of game exposure, and 3.1 injuries/1000h of training.

Male Athletes	EBT 2014	EBT 2016	P-Value
Demographics Of Injuries			
Incidence Of Injuries (%)	68.0	28.3	0.002
Injury Incidence In Training (N/ 1000 H)	1.8	3.1	
Injury Incidence In Games (N/ 1000 H)	12.0	8.0	
Injury During Game (%)	77.3	37.5	0.001
Past Injuries (>24 Months) On The Same Site As The One Reported On This Survey (%)	13.2	58.8	0.002
Treatment (Conservative) (%)	73.9	76.0	1.000
Type Of Injuries (%)			

Sprain	9.1	26.7	
Muscle Contusion	13.6	6.7	
Muscle Strain	22.7	26.7	
Fracture	9.1	13.3	
Subluxation / Dislocation	13.6	13.3	
Acl Injury	12.7	0.0	
Meniscus Injury	10.0	13.3	
Location Of Injuries (%)			
Upper Limb	23.8	20.0	0.999
Torso	19.0	20.0	
Lower Limb	57.2	60.0	
Mechanism Of Injury (%)			
Contact	56.3	66.6	0.716
Non-Contact	43.8	33.4	
Collision With Opponent	36.8	43.8	
Collision With Teammate	5.3	6.3	
Collision With Object	5.3	0.0	
With The Ball	15.8	6.3	
Alone Without Ball	21.1	6.3	
Other	15.7	37.5	
Severity Of Injury (Absence From Training In Weeks - %)			
Small (0-1)	17.2	6.7	0.251
Moderate (1-2)	44.8	33.3	
Serious (2-4)	20.7	13.3	
Very Serious (>4)	17.2	46.7	

Table 2. Comparison of injuries characteristics in male athletes between the 2014 and in the 2016 tournaments.

Female Athletes	EBT2014	EBT 2016	P-Value
Demographics Of Injuries			
Incidence of Injuries (%)	62.5	24.6	<0.001
Injury Incidence In Training (N/ 1000 H)	4.0	2.8	
Injury Incidence In Games (N/ 1000 H)	11.4	7.9	
Injury During Game (%)	59.5	73.3	0.520
Past Injuries (>24 Months) On The Same Site As The One Reported On This Survey (%)	13.6	40.0	0.056
Treatment (Conservative) (%)	85.2	92.9	0.217

Type Of Injuries (%)			
Sprain	2.7	42.9	
Muscle Contusion	10.8	21.4	
Muscle Strain	29.7	0.0	
Fracture	18.9	0.0	
Subluxation / Dislocation	8.2	35.7	
Acl Injury	15.0	0.0	
Meniscus Injury	3.9	0.0	
Location Of Injuries (%)			
Upper Limb	37.5	60.0	0.257
Torso	5.0	13.3	
Lower Limb	57.5	26.7	
Mechanism Of Injury (%)			
Contact	69.0	66.7	1.000
Non-Contact	31.0	33.3	
Collision With Opponent	43.2	60.0	
Collision With Teammate	8.2	6.7	
Collision With Object	2.7	6.7	
With The Ball	13.5	20.0	
Alone Without Ball	10.8	0.0	
Other	21.6	6.7	
Severity Of Injury (Absence From Training In Weeks - %)			
Small (0-1)	37.5	46.7	0.051
Moderate (1-2)	27.1	13.3	
Serious (2-4)	27.1	6.7	
Very Serious (>4)	8.3	33.3	

Table 3. Comparison of injuries characteristics in female athletes between the 2014 and in the 2016 tournaments.

Most injuries (79.5%) were treated conservatively in both genders. Injuries occurred more often during games (63.6%). Thirty-seven percent occurred in the defense phase of the game, 55% in the attack phase, and 8% during fast breaks. In the male group there was a statistically significant decrease in injuries during games from 2014 to 2016 ($p = 0.001$). In the same group there was a statistically significant increase in the number of injuries occurring in parts of the bodies already injured during the last 24 months from 2014 to 2016 ($p = 0.002$).

Ligament injuries (sprains, dislocations, subluxations,

anterior cruciate ligament -ACL – of the knee tears) were the most common type of injuries (45.2%), followed by muscle injuries (36.5%). The lower limb was the most common location of injuries (51.5%). Injuries in the upper limb occurred in 37.9%, and in the torso in 10.7% of cases. Collision with the opponent was the most common mechanism of injury (44.8%). Overall, contact injuries were more common (65.8%) than non-contact injuries (34.2%). There was no statistically significant difference regarding the location or the mechanism of injuries between male and female or 2014 and 2016 groups.

The severity of the injury was decided by the time to return to play (RtP), and it was found to be within 1 week from injury in 24.6% of cases, between 1-2 weeks in 34.7%, between 2-4 weeks in 18.6%, while the most severe injuries (>4 weeks RtP time) compromised 22.0% of cases. There was no statistically significant difference regarding the severity of injuries between male and female or 2014 and 2016 groups, except from the fact that female athletes overall had a higher probability of injuries of small severity (0-1 weeks RtP) than male athletes ($p = 0.009$).

Discussion

The aim of the present study was to examine the current trend of injuries in beach handball. Beach handball is a sport that is continuously gaining in popularity. Beach versions of indoor sports carry the injury risks of the indoor sport, as well as these of the environment of “sand” sports, namely an uneven ground, outdoor competition with high temperatures during the summer when these sports take place, and fatigue due to many games being played in the same day. We looked back on the data from a questionnaire on injuries distributed to players during the 2014 and 2016 European Beach Tour (EBT) finals both held in Thessaloniki, Greece. The results of each questionnaire have previously been reported [4,5]. We seek to find how injury rates behave during time in similar athletic population of the same sport. The questionnaire was the same during the two surveys, and this is a strength of the current study as it allowed for comparison of the same data.

However, the study has its limitations. The questionnaires were self-reported, so the reliability of the answers could be questioned. Furthermore, regardless of the fact that results from two questionnaires were combined, the combined sample was still small, and this hindered from in-deep statistical analysis. Epidemiologic studies require a large sample size for meaningful conclusions to be drawn. The numbers of injuries on each body part or of the various types of injuries were too small for comparisons between genders or over time to be meaningful. This is the reason that not all results are presented in Tables 2 and 3, although all were performed in case a statistically significant finding urged some further analysis. This is also the reason why correlation between rate of injuries and parameters that could possibly influence them did not yield any statistically significant outcome. Additionally, the group of athletes in the 2014 and 2016 tournaments were not the same, so the trend of injury rates does not refer to the same population, but rather to the sport population as a whole.

The overall injury rate decreased in a statistically significant degree in 2016 compared to 2014 in both genders ($p = 0.002$ for males, $p < 0.001$ for females). This could be attributed to a significantly higher use of prophylactic equipment in the male group, as it has been shown that the use of prophylactic equipment can influence the injury rate [6]. However, no similar finding was

true for the female group, and therefore the correlation could not be confirmed.

Injuries are more common during games (63.6%), with an overall injury incidence of 9.7/1000h. These findings are similar to indoor handball (75% of injuries during games [7], 12-14 injuries/1000 playing hours [8-10]). Most injuries occurred in the attack phase of the game (55%). Injuries during games statistically significant decreased in the male group between 2014 and 2016 ($p = 0.001$), but they increased in the female group, although in a nonsignificant degree. The overall injury incidence rate during training was 3.1/1000h, which also follows similar findings in indoor handball [9,11-13]. It seems that the injury rates are typical of each sport, regardless of whether they are played indoor or in the sand [4].

Previous injuries have been associated with a higher risk for future recurring injuries in the same body part [14, 15]. With the numbers available however, no such correlation could be verified. Contrary, a statistically significant increase in the number of injuries occurring in parts of the bodies already injured during the last 24 months from 2014 to 2016 was observed in the male group ($p = 0.002$), although the overall injury rate decreased.

Contact injuries are the more common injury mechanism in indoor handball [16], and that was also true in our study. Overall, 65.8% of injuries occurred through a contact, with collision with the opponent being the most common mechanism of injury (44.8%). Most injuries in handball occur in the lower limb [14,16], and this is also true in beach handball. In our study 51.5% of injuries were in the lower limb, 37.9% in the upper limb, and 10.7% in the torso. Muscle (36.5%) and ligament (45.2%) injuries were the more common in both genders. The most commonly injured joint was the knee in both genders, followed by the ankle in male, and the shoulder in female athletes. The most commonly injured muscle was the hamstrings in both genders.

The severity of the injury was defined by the time from injury to return to play (RtP). Female athletes had a higher probability of injuries of small severity (0-1 weeks RtP) than male athletes ($p = 0.009$). Overall, 24.6% of beach handball athletes returned to play within 1 week from injury, in 34.7% of them RtP was between 1-2 weeks, in 18.6% RtP was between 2-4 weeks, and in 22.0% of cases return to training took longer than 4 weeks.

Conclusion

In conclusion, the findings of the present study revealed that injuries in beach handball follow the pattern of injuries in indoor handball. They occur usually during games, due to contact with an opponent and are more commonly located in the lower limb. The injury rate decreased from 2014 to 2016 in the two competitions that we compared, but the overall small sample size

did not allow for more in-detail statistical analysis and correlation of possible predisposing factors of injuries. The same was true for in-between genders differences. Further and larger epidemiologic studies are needed in order to enhance our knowledge on the injury characteristics in beach handball.

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