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ORIGINAL

PATTERN OF INJURIES IN BEACH VOLLEYBALL AT THE SPANISH NATIONAL UNIVERSITY CHAMPIONSHIP

PATRÓN LESIVO EN CAMPEONATO DE ESPAÑA UNIVERSITARIO DE VÓLEY PLAYA

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ABSTRACT

The aim of this paper is to study the most common injuries in university beach volleyball players. The sample consisted in 33 athletes participating in the University Spanish Championship. Injuries were assessed by means of personal interviews and a validated questionnaire. Results show that the body region with the highest incidence was the ankle (33%), followed by the fingers (18.5%), knees (13.0%), shoulders (11.1%) and back (5.6%). Also, information on the moment of injury (competition or training), origin (impact or overuse) and characteristic of the injury (new or recurrent injury). Statistical processing of data for establishing significant differences was performed using the Chi-square test. Results showed a harmful effect, which differs from that of professional volley players, probably as a result of the level, hours of training and requirements of the game.

KEY WORDS: injury, beach volley, volleyball, questionnaire, performance sport

RESUMEN

Este artículo pretende establecer y determinar las lesiones más frecuentes en jugadores de vóley playa universitarios a través de una muestra de 33 participantes en el Campeonato de España Universitario. Para estudiar las lesiones, se realizó una entrevista personal mediante un cuestionario validado. Los resultados mostraron que la región corporal con mayor incidencia lesiva fue el tobillo (33,3%), seguido de los dedos de la mano (18,5%), las rodillas (13,0%), los hombros (11,1%) y la espalda (5,6%). Además también se obtuvieron datos sobre el momento de la lesión (competición o entrenamiento), su origen (impacto o sobreuso) y característica de la lesión (nueva lesión o repetida). El tratamiento de los datos para el establecimiento de las diferencias significativas se realizó a través de la prueba estadística Chi-Cuadrado. Los resultados establecen un patrón de lesiones diferente al que se produce en vóley playa profesional, probablemente como consecuencia directa del nivel, horas de entrenamiento y exigencia del juego.

PALABRAS CLAVE: lesión, voleibol, beach volleyball, cuestionario, rendimiento deportivo.

INTRODUCTION

Sport injuries as well as diagnosis and prevention have been studied throughout the years by many researchers. (Pérez Turpín et al., 2012; Pérez Turpín et al. 2013; Marins, Fernández-Cuevas, Arnaiz-Lastras, Fernandes & Sillero-Quintana, 2015). That is how anatomic regions and areas prone to suffer from a sport injury as well as their connection with the very nature of each sport are assessed.

Beach volleyball injuries have also been the object of study of researchers. It should be noted that due to their common characteristics, volleyball and beach volleyball injuries were assessed (Aagaard, Scavenius & Jorgensen, 1997). In this research, an incidence of 4.9 injuries every 1000 hours of practice was observed. Both attack and defense exercises proved to cause most of beach volleyball injuries while volleyball players showed 4.2 injuries every 1000 hours.

The first and most important research focused specifically on beach volleyball (Bahr & Reeser, 2003) was conducted during the Beach Volleyball World Championship that took place in Klagenfurt (Austria) in 2001. The largest number of injuries affected: knees, ankles, and fingers. In addition, back pain, knee pain and shoulder pain were observed.

Years later, several articles on beach volleyball injuries supported Aagaard's findings back in 1997 (Kugler, Krüger-Franke & Schurk, 2004). Aagaard observed a pattern, where 3-5 injuries occurred every 1000 hours of game time. Both attack and defense exercises led to more injuries, and specifically affected ankle and toes, and led to back and shoulder pain.

On the one hand, articles on injuries have led the academic community to go into the specifics of knee injuries (Ottesen, Barfod & Holck, 2014; Pfirrmann, Jost, Pirkl, Aitzetmuller & Lajtai, 2008) or shoulder injuries (Lajtai et al., 2009; Monteleone et al., 2014; Pieber et al., 2014) in beach volleyball players. On the other hand, studies on injuries have led to the design of rehabilitation programs (Cumps et al., 2008) and therapy treatments (Chen, Yang, Wei, Zhang & Han, 2009) for these athletes. Besides, different training programs and their relation to injuries suffered by female beach volleyball players has been assessed (Paulseth, Martinovich, Scira & Sherman, 2002).

These studies have laid the groundwork for further development of strategies to prevent injuries suffered by beach volleyball players (Bahr & Reeser, 2012).

Several studies on the biomechanics of beach volleyball help to explain a higher or lower prevalence of injuries. A detailed study of the lower body of South African players (Davies, 2002) as well as studies on the hits performed before an attack (Li & Liu, 2002), the influence of the playing surface (Bishop, 2003; Giatsis, Kollias, Panoutsakopoulos & Papaiakevou, 2004; Smith, 2006) or the break-fall techniques (Tilp & Rindler, 2013) help to understand the strengths and actions that interfere directly or indirectly with the appearance of injuries.

However, different patterns of volleyball injuries (Eerkes, 2012) and beach volleyball injuries lead to think that depending on the level or category of a sport, different patterns exist. These patterns are also influenced by the level of physical demand, and the time spent training, among others. For this reason, it is important to know and detect injuries at a university level. It should also be noted that university beach volleyball promotes its athletes, because it is one of the ways to lead someone to its professional practice.

This paper presents a study on the pattern of injuries suffered by university beach volleyball players during the Spanish Universities Championship that took place in Alicante in 2010. Our main goal is to determine the pattern of injuries that occur in this category of sport. Besides, it is also important to determine when these injuries occur, what kind of injury is and how it is.

METHODOLOGY

Subjects

The sample consists of 33 university male (21) and female athletes (12). All of them are beach volleyball players. They participated in the Spanish Universities Beach Volleyball Championship celebrated on May 5, 6 and 7, 2010. The participants' ages range from 19 to 32 years old. The mean age of participants is 24.79 ± 4.46 years old. All of them signed a consent form prior to the start of this study. The study had been previously approved by the Research Ethics Committee of the University of Alicante.

Methods

An adapted questionnaire based on a validated one was used to conduct this study (Eloranta & Tittonen, 2006). To complete this questionnaire, athletes were asked to state the injuries they suffered retroactively (up to 24 months) while being a beach volleyball player. To that end, they were asked questions related to: when, how, and the kind and area of injury.

During the interviews, athletes were explained the concepts and the different questions contained in the questionnaire intended to gather information. The abovementioned questionnaire inquired about the anatomical location of the injury (head, neck, shoulder, arm, elbow, forearm, hip, thigh and knee). Besides, the questionnaire also inquired about the kind of injury: if it was a new one or an older one. Finally, a question on how the injury happened was also included. Injuries can be impact injuries when athletes can tell when these exactly happened, and they know the origin, as well as the time and place; whereas overuse injuries are those that athletes cannot remember how they happened. The symptoms are there but the origin is unknown.

The selection of players was voluntary. Only those players interested in the study took part in it. Personal interviews were conducted during breaks and whenever players were available.

The software Statistical Package Social Sciences (SPSS) v. 19.0 was used for the statistical analysis; and comparative statistical techniques were used to compare means and percentages. The Chi Square test was used for non-parametric tests, and the levels of statistical significance, lower than $p > 0.05$, were studied.

RESULTS

Data obtained (Figure 1) show that the anatomical region where most injuries occur is the ankle (33.3%), followed by the fingers (18.5%), the knee (13%), and the shoulder (11.1%). The areas less affected by injuries are: neck, elbow, hands,

nails, abdomen, and thighs (1.9% each); forearm and toes (3.7%); and back (5.6%). Significant differences were found in terms of knee injury compared to the rest of the anatomical regions, except for the fingers (second most affected area).

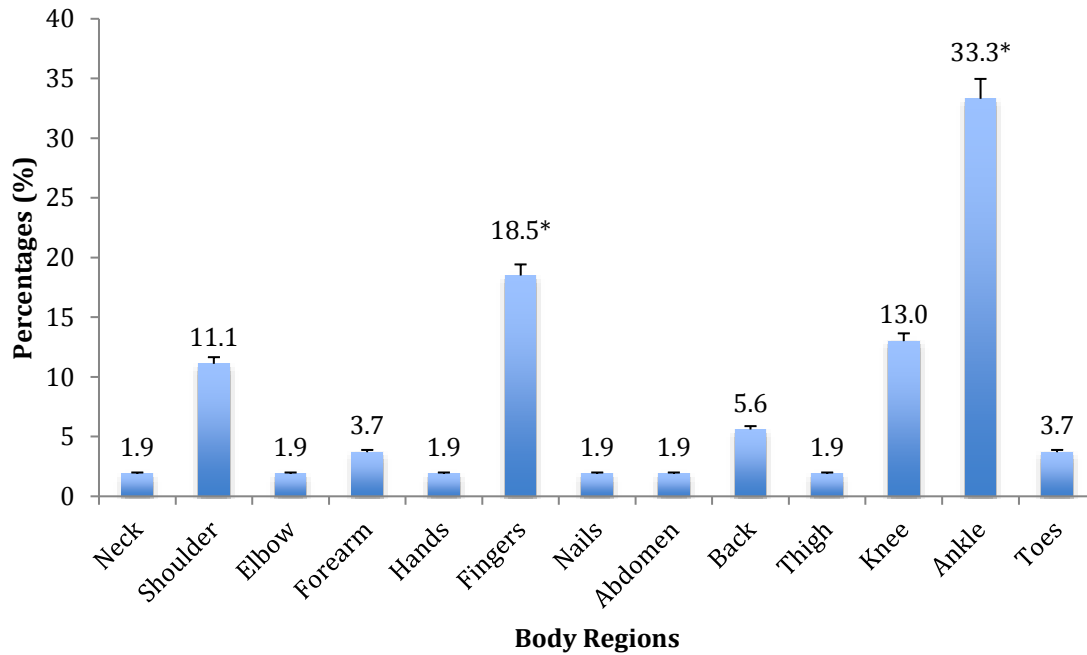


Figure 1. Injuries percentages. * $p < 0.05$.

Results indicate that injuries occur during competition (51.5%) and during training (48.5%). In regards to how the injury happened, impact is the main reason (51.5%) followed by excessive use (48.5%). Finally, regarding the kind of injury: 58.1% were new injuries, and 41.9% were relapses. The three characteristics analyzed did not show significant differences (Table 1) ($p > 0.05$).

Table 1. Frequency base on the type of injury

		Frequency (n)	Incidence %	X ²
Time	Competition	17	51.5	0.862
	Training	16	48.5	
Origin	Impact	17	51.5	0.862
	Overuse	16	48.5	
King	New injury	18	58.1	0.369
	Recurrent	13	41.9	

DISCUSSION

Both conditions and characteristics of beach volleyball condition the players' response, and the kind of injuries they suffer. Athletes even suffer from injuries and illnesses that occur in sports that are played in the sand (Frey, Andersen & Feder, 1996; Veraldi, Persico & Valsecchi, 2011).

These conditional factors are related to the very own nature of the sport. Players are subject to the technical requirements (Koch & Tilp, 2009) as well as the tactical requirements (Seweryniak, Mroczek & Lukasik, 2013), and the playing surface (Smith, 2006) or the environmental conditions (Bahr & Reeser, 2012) in which the game takes place.

These differentiating characteristics explain and define a different incidence of injuries between two similar sports: volleyball and beach volleyball. These conditions establish a different response, and a new and specific technical performance feature is needed to play in the beach. Besides, if there is a reduced number of players, the physical demand is higher, and players are forced to repeat several times the different technical actions (Jimenez-Olmedo, Pueo, Penichet-Tomás, Chinchilla-Mira & Perez-Turpin, 2017), although they are playing on a smooth surface where it is less likely for them to be injured (Vormittag, Calonje & Briner, 2009).

For these reasons, both the playing surface and the individual characteristics of the elite players show a specific injury pattern suffered by professional players. University players share a similar pattern, but with some specific differences influenced by the level of exigency, the degree of difficulty, and the playing or training conditions. All of these are different and belong to a specific category (Jimenez-Olmedo, 2015).

The last study on injuries suffered by beach volleyball players (Kugler et al., 2006) established the five most common injuries. The main injuries affected: knees, ankles, fingers, shoulders, and back (from higher to lower prevalence). This injury pattern coincides with the injuries suffered by university beach volleyball players, although prevalence data are different.

The most common injury among university beach volleyball players affects the ankle (33.3%), whereas elite players show an incidence of 17%. This injury increase among university players and the difference in the prevalence data can be related to the jump and fall techniques in the sand. These techniques have to be specific, well trained and worked (Tilp & Rindler, 2013). The lack of experience performing the receiving exercise in the sand can be one of the reasons that explain a higher prevalence of this injury among young players.

On the one hand, another body region reporting a different injury is the knee. Among elite players, the incidence is 20%, whereas among university players is 13%. Even though both (elite and university players) carried out similar attack and jump exercises (Medeiros, Marcelino, Mesquita, & Manuel Palao, 2014), different training methods (Paulseth et al., 2002) were observed among elite players. These methods increase the demands and workload, above all, during practice. These data would explain why these differences are observed when it comes to knee injuries.

Also, one of the most concerning injuries, for players, trainers and researchers is the shoulder one. This injury shows similar values among elite players (13.1%) and university players (11.1%). This higher prevalence among elite players is related to the calcification of the rotator cuff, which is directly linked to the age (Monteleone et al., 2014). This fact would explain the lower prevalence of shoulder injuries among young university athletes.

The other body regions show a different injury pattern, but similar values. For example, fingers (elite: 15%; university players: 18.5%), and back (elite: 5.7%; university players: 5.6%). These data are consistent with the results obtained in previous studies (Bahr & Reeser, 2003).

Lastly, where the kind of injuries is concerned, it is stated that these occur mainly during competition (51.5%), due to impact (51.4%), new injury (58.1%) and recurrent injury (41.9%). These data show an increased prevalence when compared to other sports assessed during the Olympics that took place in London, in 2012 (Engebretsen et al., 2013).

CONCLUSIONS

The present study finds an injury incidence present in ankles. This fact points out the need to develop and support training specific programs both in and out of the sand. This way, athletes could strengthen this body region in order to prevent future injuries.

Regarding the injury incidence, it has been observed that fingers, knee and shoulders are the most vulnerable areas. Data show that beach volleyball players suffer from both recurrent and new injuries in these areas. These injuries occur during training and competition, and statistical differences are, when it comes to impact or overuse, nonexistent.

Finally, this study helps to establish and determine the most common injuries that occur among university beach volleyball players. This study is a source of information that helps strengthen certain body regions to prevent future injuries.

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