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Investigating the Injuries in Elite Greek Powerlifting Athletes with Disabilities

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Abstract: *The epidemiology of sports injuries is an important recognition in the field of sports medicine research because it can improve the health and safety of athletes. Although the sport participation of athletes with disabilities in the powerlifting sport has increased, the existing literature on sports injuries has not been systematically studied in this population group. The aim of this study was to record the incidence, type, severity and the causative factors of injuries in para powerlifting athletes. The sample of the research consisted of 11 elite powerlifting athletes with disabilities who participated in the Pan-Hellenic Para Powerlifting Championships which held in Thessaloniki (2018). For recording and investigating injuries was used a structured questionnaire of injuries by Malliou et al. (2007). Questionnaires were distributed to athletes during the week of the competition and the participants reported the most significant injuries for the last 12 months that they did at least a week away from training or competition.The data showed that 81.8% of athletes suffered of injuries. The majority were acute injuries. The most commonly anatomical location injured was the shoulder, followed by elbow and waist. The main causative factors reported according to the personal opinion of athletes were due to overuse, poor technique, lack of warm up and cool down. The results of this study are expected to contribute to the enrichment of knowledge about the injuries of athletes with disabilities in sport of powerlifting, creatıng more effective prevention and rehabilitation programs to keep them healthy and active in the sport for longer.*

Keywords: *external injuries factors, physical disability, powerlifting athletes, prevention, sports injuries.*

I. Introduction

In recent years the sport participation of athletes with disabilities has grown significantly [1,2]. It is widely accepted that athletic activity may benefit the disabled athlete with increased endurance exercise, muscle strength, cardiovascular performance, flexibility, improved balance and also psychological benefits of exercise including improved self-image, body awareness and motor development compared to people with disabilities who do not participate in sports [3,4]. An increasing number of athletes with impairments, provides a medium for sport-related injuries [5,1] However, a lack of knowledge about sports injuries in this population, what causes them and what will do following an injury may be uniquely related to the specifics of each sport and the specific disability of the athlete. It is vital to understand the etiology and prevalence of common injuries in order to develop effective injury prevention strategies and to eliminate every risk connected with it [6].

Powerlifting became an official Paralympic sport when the bench press was launched in the Tokyo Paralympic Games in 1964 [7] and has been contested at the Summer Paralympic Games since that time. This inaugural event was exclusive to only male athletes with spinal cord injuries. The sport continued to limit participation and eligibility for competition to include only wheelchair-classified athlete until 1984. In the 1984 Paralympic Summer Games, the sport was open to other disability groups when athletes with cerebral palsy received permission to participate at the Games for the first time. Paralympic level competition was first opened to females in the Summer Games in 2000. The sports are ruled by the International Paralympic Commette and are similar to those that apply in the powerlifting competitions for able-bodied athletes [8]. Para powerlifters only participate in the bench press, which consists of athletes lowering a barbell to the chest, holding it motionless, and then pressing it upwards to arms'length until the elbows are in full extension. Athletes are given three attempts, with the winning athlete lifting the largest amount of weight [9]. The competitions are attended by men and female para-athletes which participate in various categories in the sport, according to ten weight classes (male and female) and eight impairment categories: impaired muscle power, impaired passive range of movement, limb deficiency, leg length difference, short stature, hypertonia, ataxia, and athetosis [9].

Injury data for athletes with disabilities participating in powerlifting are limited [10,11]. Existing research comes only from Paralympic Games populations that testify to poor methodological quality inconsistent definitions of injuries and heterogeneity in studies, making it difficult to draw definitive conclusions. Due to this paucity of data, the first comprehensive epidemiological reports of injuries were conducted in summer Paralympic sports, including powerlifting, and published following the London 2012 Paralympic Games [12,13]. The results shown that powerlifters had the second-highest injury incidence rate of all athletes. Also, the researchers [13] reported 44 injuries in 163 athletes over 2282 athlete-days, giving an injury incidence proportion of 27.0 and an injury incidence rate of 19.3 (95% CI; 14.0–25.8) injuries per 1000 athlete-days, but did not report more data of the injuries, including the severity, age group, gender, body position or weight group. In a recent epidemiological study [14], recorded the incidence of injuries in athletes Powerlifting during the Rio Paralympic Games (2016), with a sample of 180 athletes during the games (10 days). The overall injury incidence rate was 15.6/ 1000 days. The majority of injuries were overuse syndromes (63.6%). The most frequently injured anatomical area was the shoulder (45.5%) followed by the neck (13.6%), and with the same proportion the chest and elbow (9.1%). The researchers argued that overuse injuries, as opposed to acute is most common among high competitive level athletes in Powerlifting and shoulder remains the most frequently injured anatomical region. The results of this research demonstrated the need to develop injury prevention protocol at this high-level sport.

Similarly, in the research at the Rio 2016 Paralympic Games [15], with a sample of 141 athletes (79 men & 62 women), almost 15.6% of powerlifters on the bench reported injuries, during the bench press event,the most common source of pain was mainly to the upper extremities and in the shoulder. The researchers [16] examined the injuries of powerlifting athletes at the London 2012 Paralympic Games, during the Games (7 days). There were 38 injuries among the 163 powerlifters. The majority of injuries were overuse syndromes (60.5%), due to the repetitive nature of the exercises and the most frequently injured anatomical area was the shoulder/clavicle (31.6%), followed by the thorax (13%), elbow (13%), ankle (7.9%) and neck (5.3%). Most injuries occurred during the competive.

The efforts of athletes in competitions and intensive training burden the musculoskeletal system of athletes with disabilities. The risk of injury during lifting the barbel or training is a major problem [17]. To ensure a balance between total training load and recovery, recommendations have been published on the frequency, intensity and volume of training for able-bodied athletes [18] but for athletes with disabilities there are no such instructions. In addition, researchers [19] have previously argued that it is important to identify the factors and mechanisms that contribute to the occurrence of sports injuries, but also to introduce measures that may reduce the future risk or severity of sports injuries.

II. Significance to Sports Science

It can provide contribute to the enrichment of knowledge about the injuries of athletes with disabilities in sport of powerlifting, to develop treatments and preventive rehabilitation programs to keep them healthy and active in the sport for longer.

III. Objective of the Study

The aim of this study is therefore to record injuries and investigate the type, severity and the causative factors of injuries in powerlifting athletes with disabilities who participated in the Pan-Hellenic Para Powerlifting Championships which held in Greece (2018).

IV. Material And Methods

This research uses a mixed-methods approach. Mixed methods can refer to the use of quantitative and qualitative data in answering research questions and being part of a unique research program and designed as a complement to provide information related to different methodological approaches. The type used is sequential explanatory. Sequential An explanatory research is a study where the initial data collection is quantitative which is then followed by qualitative data, which means that quantitative data is strengthened by the qualitative data that will be obtained. The quantitative data were obtained through giving questionnaire to athletes, then followed by qualitative activities namely conducting interviews.

This study consisted of 11 elite men powerlifting athletes with disabilities with a mean age of (SD=30± 1,09 years), mean height of (SD=1.66 ± 0.15cm), mean weight of (SD=75.55 ± 15.07kg) and mean experience of participating in international competitions (SD=8.64± 5.08years), who participated in the Pan-Hellenic Powerlifting Championships which held in Thessaloniki (2018). The total sampling technique is an example of a collection technique that uses the whole of a population, then interviews all samples in this study. The instrument in this study used questionnaire and interviews. The questionnaire of Malliou, Rokka, Beneka, Mavridis and Godolias (2007) was used to record and investigate the injuries, after being adapted for the needs

of the research. It included a total of 38 questions about injuries (types, severity), external causing factors and related questions about demographic characteristics [20]. The anonymous questionnaires were distributed during the week of the competition and the training. Completion of the questionnaire was voluntary, as the necessary instructions from the researcher were given and the participants reported the most important injuries for the last 12 months that they did at least a week away from training or competition. Then conducts a semi-structured interview to confirm the quantitative results that have been carried out. As an acute traumatic injury was considered 'an injury that was caused by an acute precipitating traumatic event.' As An acute on chronic injury was considered 'an acute injury in an athlete with symptoms of a chronic injury in the same anatomical area'. Finally, a chronic (overuse) injury was considered 'an injury that developed over days, weeks or months and was not associated with any acute precipitating event'.

For the statistical processing of the research data, frequencies analyzes were used to extract percentages the non-parametric X2 distribution (Chisquare distribution) to investigate the relationship between injuries and external injuries factors. Also, descriptive analysis was performed on athlete demographics, disability characteristics, anatomic location of injury, and injury characteristics. The analysis of the data was performed with SPSS 23 and statistical significance was set at $p<.05$.

V. Results

The statistical analysis of the results showed that 81.8% of the athletes of the sample reported musculoskeletal injuries. Regarding the type of injuries, the majority of injuries were acute traumatic injury, followed by an acute on chronic injuries, followed by chronic (overuse) injuries (Table 1).

Table 1. Frequency and type of injury in powerlifting athletes with disabilities

Frequency of injury	Number	%
Injury	9	81.8
No injury	2	18.2
Total	**11**	**100%**
Type of injury	Number	%
Acute traumatic injury	5	55.6
An acute on chronic injury	3	33.3
Chronic (overuse) injury	1	11.1
Total	**9**	**100%**

Regarding the severity of the injuries, it was found that a significant percentage of injured athletes needed a hospital care, followed medical care and a smaller percentange was only first aid (Table 2).

Table 2. Severity of injury in powerlifting athletes with disabilities

Severity of injury	Number	%
Only First Aid	1	11.1
Medical care	3	33.3
Hospital care	5	55.6
Total	**9**	**100%**

The most frequently injured anatomical locations was shoulder, followed by elbow and waist with the same proportion, followed by head/neck and wrist/fingers (Table 3).

Table 3. Anatomical location of injuries in powerlifting athletes with disabilities

Anatomical location of injury	Number	Percentage %
Shoulder	5	27.8
Elbow	4	22.2
Waist	4	22.2
Wrist / fingers	3	16.7
Head / Neck	2	11.1
Total	**18**	**100%**

The most prevalent causative factors reported according to the personal opinion of the athletes were due to overuse and with the same proportion were poor technique and lack of cool down, followed lack of warm up and and poor physical condition (Table 4).

Table 4. Causative factors of injuries in powerlifting athletes with disabilities

Causative factors of injuries	Number	Percentage (%)
Overuse	5	27.8
Poor technique	4	22.2
Lack of cool down	4	22.2
Lack of warm up	3	16.7
Poor physical condition	2	11.1
Total	**18**	**100%**

Most injuries occurred directly from competition (77,8%, n=7) and fewer during training (22.2%, n = 15). A significant percentage of athletes were forced to be absent from training for more than 22 days (66.7%), followed by 8 to 14 days away from training (22.2%), while a smaller percentage were absent for 1 to 7 days (11.1%).

VI. Discussion

The results of the present study showed that the largest percentage of athletes with disabilities who participated in the Pan-Hellenic Powerlifting Championship (2018) reported musculoskeletal injuries. Specifically, of all the participants (11 athletes in total sample), 9 athletes reported injuries, with most injuries being acute. The most frequently injured anatomical location was shoulder (27.8%) followed by elbow and waist with the same proportion (22.2%), followed by head/neck (16.7%) and wrist/fingers (11.1%). Similar results were found in other studies [14,15,16]. Regarding the type of injuries,the majority of injuries were acute traumatic injuries (55.6%), followed by acute on chronic injuries (33.3%) and chronic (overuse) injuries (11.1%). Sprains in the wrist and fractures in the finger joints were the most common acute injuries. Of the chronic (overuse) injuries, tendonitis syndromes were the most common injuries. The most prevalent causative factors reported according to the personal opinion of the athletes were due to overuse (27.8%) followed by poor technique and lack of cool down with the same proportion (22.2%), followed by lack of warm up (16.7%) and poor physical condition (11.1%).

VI. Conclusion

This study shows that there is a high prevalence of musculoskeletal injuries sustained in this population. The findings of the study provide useful information to coaches and rehabilitation specialists for the design of treatment, intervention and rehabilitation programs. Understanding and identifying sports injuries and causative factors will also improve rehabilitation and treatment protocols in this disability group. These findings however need to be substantiated with larger studies to provide generalizable results. A limitation of this study is the small number of study participants.

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Competing Interests

No competing interests to declare.

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