

INJURIES IN ESTONIAN PROFESSIONAL BALLET DANCERS IN THE 2019/2020 SEASON

TARMO RIITMURU, JELENA SOKK

Institute of Sport Sciences and Physiotherapy, Tartu, Estonia

ABSTRACT

The aim of the study was to find the occurrence of musculoskeletal injuries in Estonia professional ballet dancers in the 2019/2020 season. A total of 62 dancers participated in the study, 25 were male and 37 female dancers. This study was a questionnaire-based, which was compiled on similar studies to collect the data among ballet dancers working in Estonia. The study showed that 58% of dancers were injured in the last 12 months. The most common type of dance injury during this period was muscle or tendon strain (33%), followed chronic inflammation (21%) and ankle sprain (20%). The most common injured body site was foot (20%), ankle (18%) and knee joint (10%). The highest number of injuries occurred during rehearsals (44%), classical class (27%), and during performances (16%). More than half of Estonian ballet dancers sustained at least one injury during the last twelve months. The most common types of injury were muscle or tendon strain, chronic inflammation and ankle sprain. The highest number of injuries occurred in the foot, whereas the highest number of injuries occurred during rehearsals.

Keywords: *ballet, dancing, injuries, type of injuries*

INTRODUCTION

Working as a professional dancer can be successful and rewarding, but it can also be a challenging career choice. Dancers put a lot of physical strain on their bodies because they could take part in classic classes, rehearsals, performances, tours and compete for the limited paid jobs [5]. Regardless of the dance genre and the dancer level they, are at high risk of injury [15].

Injuries obtained during a dance career can have significant consequences for satisfaction as well as aspects that affect the dancer's daily life

and identity [22]. Dance involves complex and physically intense movements that cause stress to the body and increase the risk of injury. Because ballet dancers do not cure completely injuries [2], there is a larger risk of new or recurrent injuries. Ballet dancers are often reluctant to report their injuries for fear of losing roles and seem unreliable, although it may aggravate the original injury and cause new ones [9].

Smith et al. [21] found in their study that lower limb injuries constitute 66–91% of all ballet dancers' injuries whereas 14–57% of them are ankle joint and foot injuries [21]. This may be due to constant jumping movements specific to the ballet positions (external rotation of the hip joint position and pointe (maximum plantar flexion of the foot) position) [4]. Upper body injuries usually result from lifting a partner [18] whereas the most common is upper limb injuries include shoulder dislocation, elbow joint tendonitis, wrist sprain, and metacarpal fracture [4]. Quite common injuries in ballet dancers are the ankle joint inversion sprains, fractures of the fifth metatarsal bone, stress fractures of the tibia, heel tendon and patella tendon tendinopathies, tibial periostitis, plantar fasciitis, m. flexor hallucis longus tendinopathy, anterior and posterior impingement syndrome, partial or complete tendon and muscle tears [14, 17].

Injury reporting plays an important role in the injury investigation process to help identify injury risk factors. Knowing about the occurrence of injuries gives health care workers, a chance develops methods to predict injury risk factors [10]. In 2006, Bronner and colleagues [6] developed a guide to reporting dance injuries where they also recommended assessing external risk factors, such as working time, equipment and level of technical skill. The injury report should also include the severity of the injury, type, location, tissue, activity, dance style, and dance choreography [6]. Well-designed assessment methods may identify deficiencies that can be corrected through the improvement of the physical capacity of the dancers. The assessment team may include physiotherapists, trainers, doctors, dance teachers, and other qualified staff [19]. In the treatment processes, the head of the ballet troupe and the staff responsible for rehearsals should also be involved in identifying the injury, explain the nature of the trauma to the dancer and help the dancers return to training more quickly [4]. Nowadays, it is quite common for professional dancers to work with a multidisciplinary medical staff whose job is to minimize modifiers that endanger dancer's risk factors. The role of medical staff is to provide advice on injury prevention, pre-training warm-up, ensuring adequate physical fitness for dancers for rehearsals and performances, nutrition counselling and work and rest planning [7, 20].

In summary, ballet dancers may experience various injuries during their career runs and there are several approaches to assessing them. The aim of this study was to map the injuries of Estonian ballet dancers, injury areas as well the environment in which the injuries occur, as this has not been done before.

MATERIALS AND METHODS

Inclusion in the study was on a voluntary basis. The questionnaire was web-based. The planned number of subjects was 60–150. The subjects were professional ballet dancers working in Estonia. The criteria for inclusion in the study were: age over 18 years, paid employment, working as a ballet dancer in Estonia for more than 12 months. The questionnaire was uploaded in Estonian and English version on the Limesurvey platform and sent to the Estonian National Ballet and Theatre Vanemuine to Facebook groups of ballet dancers and to forward to the Estonian Ballet Association members. Data was transferred to the Microsoft Office Excel program for analysis from the Limesurvey environment. The research is approved in the Ethics Committee for Human Research (TAIEK) of the Institute for Health Development, the corresponding permit was issued (15.01.2020, application no. 2083, decision 164).

Research methods

The questionnaire was developed by Fit to Dance 1, 2 [3, 16] and the Safe Dance report 1, 2, 3, 4 in Australia [8, 11, 12, 23]. Because the questionnaires were designed to collect data from different dance genres, then the questions adapted corresponding to the Estonian ballet landscape. The questionnaire contained a total of 32 questions, of which 22 were multiple choice and 10 numeric entry options. The number of questions depended on the answer. For example, if the dancer replied that he/she had not had any injuries in the last 12 months, there were further ones. The questions on injuries were closed and the respondent opened the following question. Questionnaire could not be sent to the author of the research without answering some questions. Answering the questionnaire took about 10 minutes.

Subjects

101 subjects started answering the questionnaire, but 62 (62%) of them were confirmed and saved. Data of 62 respondents was used, whereas according to the websites, a total of 100 ballet dancers work at the Estonian National

Ballet and Theatre Vanemuine. From this data, it can be concluded that the present sample makes up most professional ballet artists working in Estonia. The subjects were men and women, of whom 21 were soloists and 41 were ballet dancers. Women subjects mean body mass index (BMI) was normal (18.5–24.9 kg/cm²) and underweight (<18.5 kg/cm²) on the BMI scale proposed by the World Health Organization (WHO). Dance experience included with ballet school; female subjects experience was on average more than 2 years longer than male subjects. The characteristics of the subjects are presented in Table 1. 76% of the respondents were 18–29 years old (Table 2).

Table 1. Characteristics of study participants (mean ± standard deviation).

	Body mass (kg)	Height (cm)	BMI (kg/m ²)	Experience (y)	Soloist/chord ballet
Men (n=25)	73.0±6.5	180.8±5.3	22.3±1.5	16.4±5.7	11/14
Women (n=37)	51.1±3.6	166.2±3.7	18.5±1.2	18.5±6.8	10/27

BMI – body mass index, Experience – danced years including school

Table 2. Age distribution of study participants.

Age (yrs)	Men (%)	Women (%)	Total (%)
18–23	9 (36)	12 (32)	21 (34)
24–29	16 (40)	16 (43)	26 (42)
30–35	5 (20)	4 (11)	9 (15)
36–41	1 (4)	3 (8)	4 (6)
>41	0 (0)	2 (5)	2 (3)
Total	25 (40)	37 (60)	62 (100)

RESULTS

58% (n = 36) of the subjects reported dancing-related injuries in the last 12 months. 39% of these subjects had received one injury, 56% had two to three injuries and 14% had received more than three injuries in the last 12 months (Figure 1).



Figure 1. Number of injuries in the last 12 months.

The subjects were asked to open additional details of the injuries during the last 12 months. The subjects had the opportunity to choose from a pre-determined fifteen body areas more suitable for them. If there was no suitable answer for them on the list, they could choose to answer “Other” and indicate the appropriate body area. The most common injured body area was the foot (20%), followed by the ankle joint (18%) and the knee joint (10%), with the lowest incidence of injuries in the groin, pelvis and ribs at 3% (Figure 2.)

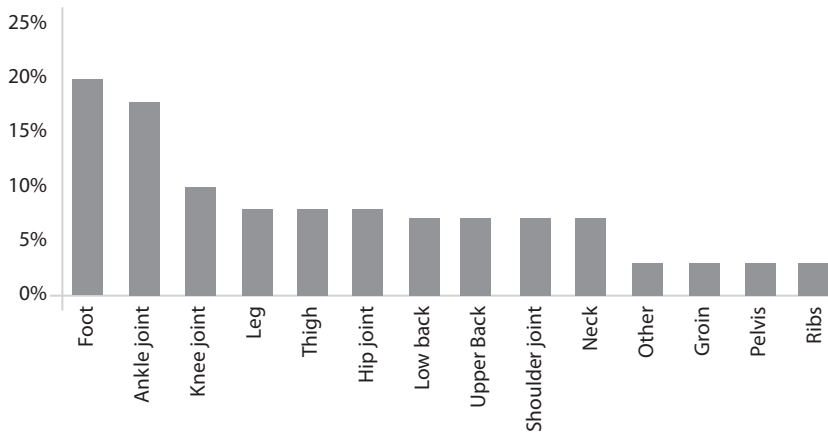


Figure 2. Body area of the most significant dance injury in the last 12 months.

The most common type of dance injury received in the last 12 months was a muscle or tendon stretching/rupture (33%), followed by chronic inflammation (21%) and sprain (20%) (Figure 3). The highest number of injuries occurred in rehearsals (44%), in classical lessons (27%) and during performances (16%). Two of the subjects mentioned that their injuries did not occur during the dancing activities, but they had arisen over a long period of time from the interaction of all these activities. In addition, two subjects mentioned that they were injured outside working hours as a result of an accident (Figure 4).

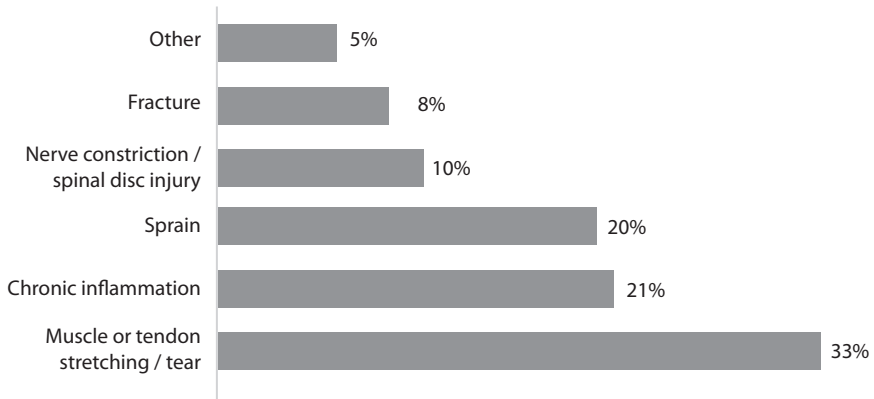


Figure 3. Type of most significant dance injury in the last 12 months.

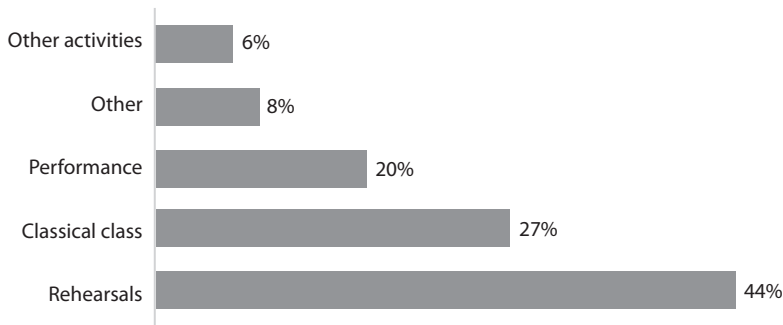


Figure 4. Action at the time of injury.

DISCUSSION

The aim of the study was to find out how many injuries among ballet dancers engaged in professional dance in Estonia were present based on a questionnaire. Sixty-two dancers answered to the questionnaire, of which 37 were female dancers and 25 male dancers.

More than half of the respondents had injuries during the last 12 months. These results are similar the results of a study conducted in Australia, which examined the incidence of injuries in the previous 6–12 months, which showed that 48–78% of respondents have experienced in the previous 6–12 months at least one injury [23].

In this study, the most injured body area was the foot, ankle joint and knee joint. Similar results were obtained in Australia and the United Kingdom studies which have shown that 23–26% of injuries occurred in the ankle joint area [16, 23]. These results are also supported by research which

based on a review of the systematic literature by Smith et al. [21], which was found that foot and ankle joint injuries accounted for 14–57% of all injuries. Gamboa et al. [13] found that 48% of injuries occurred in the foot and ankle joint area, followed by hip (21.6%) and knee joint (16.1%) injuries.

The present study found that the most common type of injury was muscle/tendon stretch or rupture followed by chronic inflammation and sprain. There are similar results received Vassallo et al. [23] in their study, which found that 25% of injuries were caused by a rupture (strain), 19% had a chronic inflammatory condition and 18% of the injuries were sprains.

The body area where the injury occurred: almost half of the injured subjects said that they were injured in the rehearsal, over a quarter of respondents were injured in the classical class and less than a quarter of respondents during the performance. Vassallo et al. [23] and Geeves [11] found in their study that 41–42% of dancers thought that they got injured in the rehearsals. High injury rates in rehearsals may be associated with the fact that dancers have a heavy workload and most of their work is rehearse, and therefore, dancers are at risk of injury due to fatigue and overload [1]. Professional dancers working in Estonia also spend a lot of time rehearsing and therefore, their percentage of injury in the samples may be higher. The dancers reported good warm-up habits. All the dancers claimed to do before performance warm-up exercises. Before classical class most of the subjects did warm-up exercises and before the rehearsals did warm-up exercises. The habits of doing relaxation exercises were less popular, which has also been confirmed by previous studies [16, 23].

After the rehearsal, a little more than half of the subjects did relaxation exercises; after classic class performed, a little over a quarter of the subjects did relaxation exercises and the subjects answered the least that they do relaxation exercises after the performance.

In conclusion, the results of the study showed that more than half of Estonian ballet dancers were injured during the last 12 months, whereas many of them had one or more injuries. The most common type of injury in Estonian ballet dancers was muscle/tendon stretching or tearing, chronic inflammation and sprain of the ankle. Estonian ballet dancers had more injuries in the foot area, followed by the ankle and the knee joint, whereas most of the injuries happened in the rehearsals.

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Correspondence to:

Jelena Sokk
Institute of Sport Sciences and Physiotherapy
Faculty of Medicine
University of Tartu
4 Ujula street, EE 51008 Tartu, Estonia
E-mail: jelena.sokk@ut.ee