Issue Rehabil. Orthop. Neurophysiol. Sport Promot. 2022; 41: 7–13. ISSN 2300-0767
DOI: 10.19271/IRONS-000175-2022-41

ORIGINAL ARTICLE

EPIDEMIOLOGY OF INJURIES IN POLISH POLE DANCE AMATEURS

EPIDEMIOLOGIA URAZÓW U AMATORÓW POLE DANCE W POLSCE

Maciej Małolepszy[1], Katarzyna Kwas[1], Karolina Defińska[1], Urszula Smyczyńska[2], Adam Kwapisz[1]
[1]Clinic of Orthopedics and Pediatric Orthopedics, Medical University of Lodz, Lodz, Poland
[2]Department of Biostatistics and Translational Medicine, Medical University of Lodz, Lodz, Poland

ABSTRACT

Introduction

Pole dance is considered a moderate-intensity exercise that improves health, and cardiorespiratory fitness as a combination of dance, sport, and physical recreation. However, due to its physical demand, pole dance may cause potentially severe injuries. According to the literature, 85% of all pole dancers reported injury during training.

Aim of the study

The aim of the study was to determine the frequency and characteristics of injuries in female pole dance amateurs in Poland.

Materials and methods

In this prospective survey, case-control research, data was collected from female pole dancers using online questionnaires. The survey was composed of 23 questions, concerning the type of injury, the way of its treatment, complications, and recovery time. The collected data was statistically analyzed.

Results

445 females (mean age = 30.8 years, SD = 5.67) were included into the study group. 42.9% of females reported injuries, the most common were contusions (60.2%) and dislocations (19.9%). The shoulder (27.2%) and wrist (12%) were the most frequently affected structures. 80% of injuries required discontinuation in training, whereas 76% of all trauma cases demanded consultation with doctors or physiotherapists. The further analysis stated that risk factors for injury were age ($p = 0.0138$) and training frequency ($p = 0.003$). The incidence of injury was also influenced by the duration of practice ($p < 0.0001$). In 59.7% of cases, injury considerably influenced respondents' daily activities.

Conclusions

Pole dance is a demanding sport with a high incidence of injuries, which mostly affect the upper extremities. A higher risk of injury may be determined by increasing age, duration, and frequency of training.

Keywords: epidemiology, injuries, sport medicine, pole dance

Author responsible for correspondence:
Katarzyna Kwas
Klinika Ortopedii i Ortopedii Dziecięcej, Uniwersytet Medyczny w Łodzi
Ul. Pomorska 251, Łodź, Poland
tel. +48 509950694
https://orcid.org/0000-0002-2055-5914

Authors reported no source of funding
Authors declared no conflict of interest

Date received: 26th October 2022
Date accepted: 18th November 2022

STRESZCZENIE

Wstęp

Pole dance to aktywność o umiarkowanej intensywności określana jako połączenie tańca, sportu i rekreacji fizycznej, która znacznie poprawia wydolność krążeniowo-oddechową.

Niemniej jednak pole dance może powodować potencjalnie poważne obrażenia. Według dostępnej literatury, aż 85% wszystkich tancerzy pole dance doznało kontuzji podczas treningu.

Cel badania

Celem pracy było określenie częstości i charakterystyki urazów u amatorek pole dance w Polsce.

Materiały i metody

W badaniu prospektywnym dane zebrano od tancerek pole dance za pomocą kwestionariuszy internetowych. Ankieta składała się z 23 pytań dotyczących typu urazu, sposobu leczenia, powikłań oraz czasu rekonwalescencji. Zebrane dane poddano analizie statystycznej.

Wyniki

Do grupy badanej włączono 445 kobiet (średnia wieku = 30,8 lat, SD = 5,67). Urazu doznało 42,9% kobiet, najczęściej były to stłuczenia (60,2%) i zwichnięcia (19,9%). Bark (27,2%) i nadgarstek (12%) były najczęściej dotkniętymi urazem strukturami. 80% urazów wymagało przerwania treningu, natomiast 76% urazów wymagało konsultacji z lekarzem lub fizjoterapeutą. Dalsza analiza wykazała, że czynnikami ryzyka wystąpienia kontuzji były wiek ($p = 0,0138$) oraz częstotliwość treningów ($p = 0,003$). Na częstość występowania urazów miał również wpływ czas trwania treningu ($p < 0,0001$). W 59,7% przypadków uraz znacząco wpłynął na codzienną aktywność badanych.

Wnioski

Pole dance to wymagający sport, w którym często dochodzi do urazów, dotyczących głównie kończyn górnych. Ryzyko kontuzji zwiększa się wraz z wiekiem, wydłużeniem czasu trwania i zwiększonej częstotliwości treningów.

Słowa kluczowe: pole dance, injuries, sport injuries, epidemiology

Introduction

Pole dance is a form of physical activity whose popularity has been growing among young females in Poland for the last couple of years. Since 2017, it has been officially accredited as a sports discipline, combining dance, sport, and physical recreation (Diogo *et al.* 2016, Ruscello *et al.* 2017). According to American College of Sports Medicine guidelines, Nicolas *et al.* considered pole dance training as a moderate-intensity exercise, improving health and cardiorespiratory fitness when trained >= 150 minutes per week (Nicholas *et al.* 2019). Nawrocka *et al.* described how pole dance training could contribute to considerable strength and postural stability improvement (Nawrocka *et al.* 2017). However, due to its physical demand, pole dance may cause potentially severe injuries. As it was previously stated, pole dance has a lot of positive physiological aspects; however, it significantly increases the risk of injuries. In the work of Szopa *et al.*, 85% of pole dancers were described to have reported sustaining some kind of injury (Szopa *et al.* 2022).

Lee *et al.* described that most injuries regarded shoulder joints, wrist, and back. Also, Lee's results showed females over 40 years old were subjected to 3.7 times longer

recovery than younger females (Lee *et al.* 2020). Moreover, Naczk *et al.* reported that proper warm-ups and a balanced diets are critical protective factors in preventing injury (Naczk *et al.* 2020). Despite the growing popularity of this discipline in Poland, there is still a lack of studies regarding the epidemiology and management of injuries in the eastern European or Polish population (Nawrocka *et al.* 2017, Gołuchowska *et al.* 2021).

Aim of the study

This work-study is a questionnaire survey aiming to identify the types and frequency of injuries and demonstrate their effects and management on amateur pole dancers.

Materials and methods

The research was conducted online and at pole dance clubs from May 2018 to February 2019. Inclusion and exclusion criteria were proposed to properly set the study group.

Inclusion criteria included female sex, age over 18 years old, consent to participate in the research, regular pole dance training (at least once a week), and female amateurs (female amateurs who have never worked as pole dancers). The exclusion criteria comprised of age below 18 years old, male sex, professional pole dancers (trainers, champions, etc.), irregular training, bone, soft tissue, genetic or metabolic disorders (eg. Osteogenesis imperfecta, achondroplasia).

445 anonymous questionnaires were collected from adult women who met inclusion criteria, 401 females completed questionnaires online and 44 completed it manually in their pole dance sport club. Those surveyed online were women members of popular groups for Pole Dancers on social media (Facebook). The survey consisted of 21 open and closed questions regarding demographics, frequency, and hygiene of pole dance training, trauma, and its influence on daily activities. The survey was distributed online and at the pole dance sports clubs. A 10-point Borg's sport activity scale has been used to assess the pole dance training effort. Such a scale was chosen since its an easy and objective tool, which also allows comparison to other studies in the future [6].

Obtained results were calculated using statistical tests, e.g., the Chi2 and regression tests. Statistical significance was stated when $p > 0.05$. Approval of the bioethics committee was acquired (RNN/85/17/KE).

Results

445 females with a mean age of 30.8 years (SD = 5.67, min. = 18 years, max. = 50 years) were included in the study. 8.5% of females trained for longer than one year, and 84.9% determined their experience in pole dance as average or advanced. Among the study group, the most common (43.4%) was two times a week training, and 51.5% of females stated their effort as 5–6 points on Borg's scale as presented in table no. 1. Only one-third of the study group declared pole dance as their only physical activity. Almost all females (98%) followed a 10-minute warm-up before the training, and 77% performed stretching after one.

Table 1. Reported level of effort in the study group.

Level of effort according to the Borg's scale	Number of Patients (n)	Percentage of the study group [%]
Minimal	13	2.9
Easy	15	3.4
Moderate	114	25.6
Sort of hard	229	51.5
Hard	64	14.4
Really Hard	9	2
Maximal	1	0.2

Epidemiology and injuries

42.9% (n = 191) of the respondents reported an injury requiring the suspension of the training, and 48.7% of them had more than one of this type of injury from practice outset. In almost 90% of cases, trauma demanded a pause in the pole dance practice. The most common injury was contusion (60.2%), and the least was fracture (5.2%). Predominant traumas were related to the shoulder joint (27.2%), and wrist (12%); less common were head (1.1%) and hand (1.1%) injuries. These data are presented in figure no.1, 89% of injuries occurred during training, 4.7% during the warm-up, and 3.15% during competition or other activities.

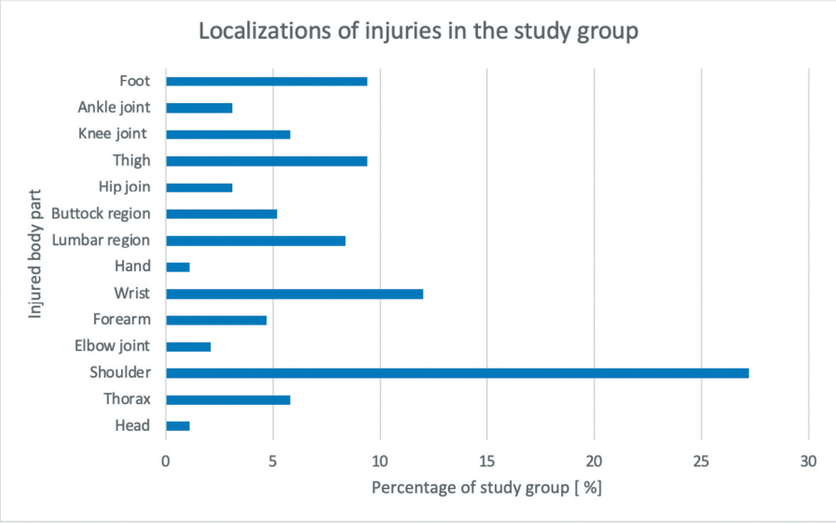

Figure 1. Localization of injuries in the study group

Effects of the injury

Around 76% of injured females demanded consultation with doctors or physiotherapists.

The incidence of such consultation was statistically significant (p = 0.0231). Only 68.7% of all injuries involved medical care examination. Statistically significant was the dependence of consultation frequency on the type of injury (p = 0.0231).

Over 80% of females had to dismiss their physical activity from 1 week to 3 months. Over half of the study group (55.5%) stopped training for three weeks, and recovery time took from 2 weeks to 3 months in 73.8% of females. Such results suggest that some females got back to physical activity before achieving full physical fitness. Nonetheless, 17.8% of injured women got back to fitness after more than three months and 4.2% over one year. The recovery time lasted more than one month in 53% of contusions, 71.4% of sprains, 63.2% of dislocations, and 100% of fractures. Differences in injury incidence and recovery time were statistically significant (p = 0.0136). Furthermore, differences in the time of recovery in the groups of injuries consulted with the specialist (32.4%) and not-consulted ones (63%) were statistically significant (p = 0.0002).

The most common injuries management were a break in training (66%) and massages (47.6%). An uncommon treatment was physiotherapy (16.2%), such as cryotherapy or different types of immobilizations. 46.1% of respondents used non-steroidal anti-inflammatory drugs or healing-assisted medications as presented in table no. 2. 85.3% of injury cases had a positive treatment effect, additionally 86.9% of females found their injury treatment satisfying.

88.5% of the study group ignored minor injuries or practiced despite the pain (82.2%). 43 of 191 (47.3%) females exercised despite

Table 2. Management of injuries.

Type of treatment used	Number of females (n)	Percentage of the study group [%]
Break in training	126	66
Massages	91	47.6
Medications	88	46.1
Ice compress	52	27.2
Physical therapy	31	16.2
Immobilization	26	13.6
Lack of treatment	17	8.9

doctors' contraindications, and 5 of them withheld information about the injury from their physicians. In 59.7% of cases, the injury significantly influenced their daily activities.

Injury risk factors

Analysis performed using the logistic regression test stated that the risk factors for the injury were age (CI 95% 0.05 (0.01; 0.08), p = 0.0138) and the training frequency (CI 95% 0.39 (0.18; 0.61) p = 0.003). The incidence of injury was also influenced by the duration of practice (CI95% 0.48 (0.29;0.66) p < 0.0001). Therefore, it is shown that the increasing age, duration of the training, and experience determine a higher risk of injury. Such results are self-explanatory; females with longer training experience in pole dance had an increased risk of injury since the risk accumulated over time. However, even after statistical alterations, age and frequency of training still had a significant influence on the risk of injury.

Discussion

This study is the first of its kind to assess injuries in pole dance in the Polish population on such a large group of women. It is also the second to assess injuries overall in this discipline. Our study demonstrates the scale of the problem, describing that statistically, 42.9% of pole dancers get injured during pole dance training. Compared to other popular sports in Poland, Crossfit, Feito *et al.* presented that 29.4% of the study group got injured during this discipline training [2].

This study has shown that the most common injury among Polish women who train pole dance was a contusion (60.2%). Among our respondents, the most common trauma concerned the shoulder joint (27.2%), whereas Sugimoto *et al.* showed that the most common injury among women training CrossFit was the knee injury (30%) (Sugimoto *et al.* 2014). On the other hand, Feito *et al.* and Montalvo *et al.* report that the most common injury among women training in CrossFit is shoulder trauma (over 35%) (Montalvo *et al.* 2017). According to Feito *et al.*, injury to the back area is the second most frequent (slightly over 30%) in women training in CrossFit. In our study, only 8.5% of women were injured in the back (Feito *et al.* 2018). For comparison, in a sport of a completely different nature, boat hockey, women's most common injuries are thigh, head, and knee injuries (13%, 13%, and 12%, respectively), according to Schick *et al.* (Schick *et al.* 2003).

Analysis of the study showed that 73.8% of the injured woman returned to fitness within two weeks to three months, while as many as 55.5% of women returned to training within three weeks after the injury, suggesting that some respondents returned to training before they fully recovered.

91.1% of the injured woman used some form of treatment. It was observed that the most common method of injury management was a break in training, massage, and the use of drugs (66%, 47.6%, and 46.1%, respectively). According to McGuine *et al.*, 71.8% of respondents training Crossfit used different ways of injury treatment, and the most common were physiotherapy (46.4%) and rest or the use of drugs (23.2%) (McQuine *et al.* 2019).

An important finding is that 22.5% of the study group trained despite the doctor's contraindications, and five women happened to withhold information about the injury from the doctor. As a result of data analysis, we found that the risk factors for injury were age, frequency of training, and period of training. In other words, the older a woman or the more frequent training or more training experience, the greater the risk was. McQueen *et al.* stated that the risk of injury in people who train in CrossFit is lower than in those who train more than three times a week (McQuine *et al.* 2019).

Limitations

The questionnaire lacks the possibility of an objective assessment of women's fatigue during training and an accurate, specific determination of the types of injuries that caused high subjectivity of the responses of the study group. Other analysis problems resulted from the survey structure, which also requires refinement in the subsequent work of this type. It would be worthwhile to conduct a study that carefully analyzes the effort during pole dance training - there is no such analysis in the literature. Another valuable research direction would be a reliable analysis of actual injuries based on professional medical data and the prospective observation of their treatment and possible consequences.

Conclusions

Pole dance occurred to be a sport with a high incidence of injuries since 42.9% of respondents reported an injury, which is 42.4% of cases that required discontinuation of training for over three weeks. Since this discipline is physically demanding, practiced most often by young women aged 30.8 years, 51.5% of the study group described the level of fatigue in pole dance as "quite heavy" on Borg's scale. During pole dance practice, the most common injuries were contusions, which commonly appeared in the shoulder joint and wrist regions.

REFERENCES

Diogo, M.A., Ribas, G.G., Skare, T.L. (2016) *'Frequency of pain and eating disorders among professional and amateur dancers.'* Sao Paulo Med J. 134(6).

Feito, Y., Burrows, E.K., Tabb, L.P. (2018) *'A 4-Year Analysis of the Incidence of Injuries Among CrossFit-Trained Participants.'* Orthop J Sports Med. 6(10).

Gołuchowska, A.M., Humka, M.I,. (2021) *'Types of the locomotor system injuries and frequency of occurrence in women pole dancers.'* J Sports Med Phys Fitness.

Lee, J.Y., Lin, L., Tan, A. (2020) *'Prevalence of pole dance injuries from a global online survey.'* J Sports Med Phys Fitness. 60(2): pp. 270–275.

McGuine, T. A., Pfaller, A., Kliethermes, S., Schwarz, A., Hetzel, S., Hammer, E., & Broglio, S. (2019) *'The Effect of Sport-Related Concussion Injuries on Concussion Symptoms and Health-Related Quality of Life in Male and Female Adolescent Athletes: A Prospective Study.'* Am J Sports, 47(14): pp. 3514–3520.

Milot, M.H., Léonard, G., Corriveau, H., Desrosiers, J. (2018) *'Using the Borg rating of perceived exertion scale to grade the intensity of a functional training program of the affected upper limb after a stroke: a feasibility study.'* Clin Interv Aging.14: pp. 9–16.

Montalvo, A.M., Shaefer, H., Rodriguez, B., Li, T., Epnere, K., Myer, G. (2017) *'Retrospective injury epidemiology and risk factors for injury in CrossFit.'* J Sports Sci Med,16: pp. 53–59.

Naczk, M., Kowalewska, A., Naczk, A. (2020) *'The risk of injuries and physiological benefits of pole dancing.'* J Sports Med Phys Fitness, 60(6): pp. 883–888.

Nawrocka, A., Mynarski, A., Powerska, A., Rozpara, M., Garbaciak, W. (2017) *'Effects of exercise training experience on hand grip strength, body composition and postural stability in fitness pole dancers.'* J Sports Med Phys Fitness.,57(9): pp. 1098–1103.

Nicholas, J.C., McDonald, K.A., Peeling, P., Jackson, B., Dimmock, J.A., Alderson, J.A., Donnelly, C.J. (2019) *'Pole Dancing for Fitness: The Physiological and Metabolic Demand*

of a 60-Minute Class.' J Strength Cond Res, 33(10): pp. 2704–2710.
Redel-Macías, M.D., Del Rio, C., Arezes, P., Aparicio-Martínez, P., Cubero-Atienza, A.J. (2021) *'Environmental Conditions of Dance Rooms and Its Impact on Dance Conservatories Teachers.' Health* (*An Andalusian Study*).' Int J Environ Res Public Health,18(10): pp. 5319.
Ruscello, B., Iannelli, S., Partipilo, F., Esposito, M., Pantanella, L., Dring, M.B., D'Ottavio, S. (2017) *'Physical and physiological demands in women pole dance: a single case study.'* J Sports Med Phys Fitness, 57(4): pp. 496–503.
Schick, D. M., & Meeuwisse, W. H. (2003) *'Injury Rates and Profiles in Female Ice Hockey Players.'* Am J Sports,31(1): pp. 47–52.
Sugimoto, D., Zwicker, R. L., Quinn, B. J., Myer, G. D., & Stracciolini, A. (2019) *'Part II. Comparison of Crossfit-Related Injury Presenting to Sports Medicine Clinic by Sex and Age.'* Clin J Sport Med,30(3): pp. 251–256.
Szopa, A., Domagalska-Szopa, M., Urbańska, A., Grygorowicz, M. (2022) *'Factors associated with injury and re-injury occurrence in female pole dancers.'* Sci Rep,12(1): pp. 33.