In your shoes: A qualitative study on the perspectives of professional dancers and staff regarding dance injury and its prevention

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Abstract
This study explored the perspectives of dancers and staff of the Dutch National Ballet, regarding injury definition, injury risk factors, and preventive measures. We conducted two focus groups: one with the medical/artistic staff and another with dancers. Data were analyzed inductively by two independent coders, through the constant comparative method, based on Grounded Theory. Participants defined an injury based mainly on dance performance limitations, while pain and time loss reflected injury severity. Dance injury was described as a spectrum of injury levels that depend on the ability to perform to the best of their ability, pain levels, and potential modification on dance participation. The imbalance between workload and the dancers’ capacity to deal with load was perceived as the main cause related to injuries. Injury prevention was described as a dynamic balance between being prepared to deal with load and managing load. The critical factors that modulate the injury prevention process were as follows: teamwork, communication, experience, and planning. Our findings show injury is not defined by a clear cutoff, with multiple injury risk factors interacting and evolving, making injury prevention a constant challenge.
1 | INTRODUCTION

Professional dancers combine high physical demands with artistic expression. The high incidence of dance injuries is well acknowledged and is arguably underestimated.1-5 Demographical, biomechanical, and environmental risk factors have been identified in different dance settings and levels.1,6-8 However, literature reviews have indicated inconclusive or divergent results, questioning the quality of evidence regarding dance injury risk factors.1,7 To pursue more robust evidence, it is recommended to apply a standard injury definition9 in epidemiological studies and to develop more prospective descriptive studies.10 Some studies reported efficacious dance injury prevention programs.11-14

Recently injury prevention research was posed with a new perspective, stating that sports injuries are a complex phenomenon.15,16 These contemporary views propose an ecological and dynamic systems approach as well as use of qualitative methods to understand injury occurrence.15,16 The same reasoning can be applied to dance injuries, which can also be acknowledged as complex. Dancers have a unique environment that merges artistic and athletic needs, with a huge diversity of dance styles, levels of performance, and company and schools structures. Therefore, a better understanding of the dance injuries context is critical to develop sustainable preventive measures for dance injuries. Previous studies have explored some aspects of the injury from the perspectives of dancers. These studies have described a normalization of pain and injury, the pressure to perform and the challenge to find appropriate health care.17-20

Following this reasoning, dancers and staff perceptions regarding dance-related injury can provide valuable information to develop context-driven strategies to reduce dance injuries. Therefore, this study aimed to explore the perceptions of dancers and staff regarding the injury and its prevention in a professional dance company.

2 | MATERIALS AND METHODS

Dancers and members of the medical and artistic staff from Het Nationale Ballet Amsterdam (ie, the Dutch National Ballet) were invited to participate in this study. The Dutch National Ballet is the largest dance company in the Netherlands, with a wide repertoire from classical to modern ballet with over 80 dancers from all over the world.

Two focus groups were scheduled in May 2018 by the company. The groups aimed to have a heterogenous composition based on maximum variation sampling.21 The dancers’ group had soloists and members of the corps de ballet from different countries, representing the diversity of the full cast while the staff group had representatives ranging from ballet masters, health professionals, managers, and trainers/rehearsal assistants. Such diversity allows a broader view of the topics from a variety of perspectives and backgrounds, and also reflects the composition of the company. The FG’s duration was 75 and 50 minutes for the staff and the dancers, respectively. A trained researcher (CB) moderated the discussion, while another researcher (RvR) observed and collected notes about the group dynamic. The topic list of the interview is presented on Table 1. All voluntary participants signed a written informed consent, and VU University Medical Center Ethical Committee had approved this study.

Interviews were audio-recorded, transcribed verbatim, and then inductively analyzed by the constant comparative method, based on principles of Grounded Theory.22 The first

| TABLE 1 | Topic list and interview guide for the focus groups |
| --- | --- |
| **Interview guide** |  |
| Injury definition | What do you consider as an injury? |
| | How do you define an injury? |
| Factors influencing injury occurrence | Which factors influence the occurrence of an injury? |
| | How do these factors influence the injury occurrence? |
| Injury prevention measures | Who is responsible for the prevention of injuries? |
| | Which injury prevention strategies do you apply and why? |
| | How do you choose your injury prevention strategies? |
| | Which factors in your daily routine support injury prevention? |
| | Which factors make injury prevention more difficult? |

Note: Additional questions were added depending on the dynamic of the group discussions.
step consisted of an open-coding process where CB and RvR independently read the transcripts and coded pieces of data with descriptive labels. In a meeting, they discussed and refined the analysis by drawing connections between codes (eg, grouping two codes related to an overarching idea) until consensus was reached. After agreement, CB and RvR developed the preliminary results of the analysis. Thereafter, CB and RvR discussed the main themes with JS, who was not present in the interviews and critically appraised the analysis. Finally, they developed the central ideas of the analysis providing a conceptual description of the results.

3 | RESULTS

The group composed by medical and artistic staff (ie, ballet masters, dance teachers, choreographers, and health professionals) had 7 participants, with a mean age of 57 years (range 44-67); 6 were female. The group composed by dancers had 10 participants, with mean age of 27 years (range 20-35); 6 were female.

The main themes that emerged from the data analysis were as follows: (a) injury definition, (b) factors related to injury occurrence, and (c) injury prevention measures. There were differences and similarities regarding dancers and staff perspectives, which are illustrated by the quotes. However, during data analysis, it became clear that they described similar concepts. Therefore, the findings from dancers and staff were merged, as the main codes did not differ between both dancers and staff.

Dancers and staff mentioned different constructs to define or describe a dance injury, such as: performance limitation, pain and changes in participation (limited or non-participation) in classes and shows (Figure 1). Both groups most frequently defined an injury as a limitation regarding (optimal) performance level, or as this dancer said: “something that limits you to do your 100%.” Pain was cited many times during the group discussions, with remarks like “pain doesn’t mean injury,” or by acknowledging that “pain is part of a dancer’s life.”

Dancers and staff described different “levels of injury,” implying that it is difficult to find a unique definition of injury as this dancer explained: “you have pain, you can still work, through it. But you can’t do your full, your 100%, as you can when you are not injured. And of course you have the ones (injuries) that you cannot.” Staff and dancers

**FIGURE 1** Injury definition diagram supported by quotes from the focus group. This figure represents the concept of the injury spectrum. The injury definition was described focusing on the ability to perform optimally, while pain and changes on participation were frequently mentioned as an underlying concept to describe the injury as an ongoing process. In the end of the spectrum, being-out or the inability to perform was a cutoff point to define the “severely” injured dancer. All these concepts are part of the trajectory of the injured dancers and cannot be clearly delimited.
acknowledged that missing classes or shows due to an injury is a clear cutoff point to define injury and that the company itself—as an institution—define injury based on lost performances and classes. But on the other hand, the participants understand that injured dancers can (and will) participate in rehearsals and performances based on their ability to dance through pain. So performing on stage does not mean that the dancer is not injured.

The dynamic and complex relationship between load and load capacity was consistently mentioned as the overarching reason for occurrence of dance injuries as described by this staff member: “The big thing is the workload, in my feeling, and the balance between the workload and the way the dancer can handle this.”

Load—mostly overload—was consistently mentioned by staff and dancers as main risk factor, like this dancer pointed out: “Overload. That is the reason we get injured, nothing else. The moment we get overloaded, we can’t handle, nobody can.” In this way, the participants extensively discussed load and related factors, such as repertoire and daily schedule. Additionally, load consistency, that is, the way load is distributed along the day and/or the season, was mentioned often in FG with both dancers and staff as a load-related factor for the occurrence of an injury. The structure of the training and work schedule was mentioned also. Despite the fact that the schedule is planned by the staff, the schedule can also be influenced by labor regulations, such as by clauses in the collective labor agreement (in Dutch: “CAO”). The schedule also has an impact on recovery time. Therefore, the interrelatedness of the afore-mentioned load-related factors indicates the complexity of load as a concept, as presented in Figure 2.

Still, the factors that affect load capacity were discussed briefly by the staff, mainly referring to dancer-related individual factors (eg, nutrition, mental health), but these factors were not directly mentioned as risk factors by the dancers.

Regarding injury prevention measures, the relationship between load and load capacity was mentioned again by dancers and staff. Being prepared, “fit” or “strong enough,” was constantly referred to by both groups as the main preventive measure. The management of their fitness level has a close relation with the load as mentioned by this dancer: “When something heavy is coming up, I have to do enough exercises, enough things to get strong for what is coming.”

The need to understand and manage the load was presented by the staff as well: “when the season starts, we need to sit together with the artistic and medical staff. So… where is the load? The load is there.”

The relation between load and the specific preparation was highlighted by this staff member: “Our priority would be to see the schedule for the year. Where is going to be the hotspots - the most demanding parts? That is another problem. Because if you want to do preventive training, we want to know who is doing the “bluebird”[main role], the heavy things.”

Injury prevention was described as a challenge between being prepared and managing load: “It’s also hard to prepare...”
yourself during a very heavy workload.” The staff also discussed the high workload and time constrains to develop a better preparation for the dancers: “How can we do prevention without going over the workload? You have to make choices. What is the priority at this moment? Full class every day? And a full rehearsal every day? Or we want to get them to a higher level with an extra fitness program. But then, you still have limited time.”

The participants referred to the importance of long-term planning to prevent injuries, as this relates to load consistency and the scheduling of performances, factors previously described as being related to the occurrence of injuries. Short-term planning of the season was perceived as a factor that impacts the proper preparation, as mentioned by this dancer: “One thing that I think could help is if we could know our repertoire a bit sooner (...) knowing individually what we are gonna do in those ballets. So, we can have a preparation.” The artistic team also reported challenges to follow the planned season, because of last minute changes due to injuries: “it is the big problem the planning, in combination with casting and the changes in the castings.” An overview of the above mentioned main measures and critical factors of injury prevention process is presented in Figure 3.

Dancers and staff agreed that the main responsible person to prevent an injury is the dancer, but the staff has a role to support, as this dancer expressed: “So they [the staff] help me, but it’s really my own responsibility.” Therefore, the importance of teamwork was mentioned when acknowledging the shared responsibility to prevent injury. Following this topic, the communication between all stakeholders was also frequently mentioned as part of the injury prevention process. The importance of an open and trustworthy communication between dancers and the artistic staff was highlighted by this dancer: “You always get pain throughout the year. So, if you don’t feel that there is space for you to tell them that you are hurting or that something is going on, then you keep going, which will turn into an injury.” Dancers and staff emphasized the importance of communication and collaboration between medical and artistic staff in the process as well.

Dancers and staff also described the preparation process and how to prevent injuries as a learning process that can be affected by the dancers’ experience, their previous injuries and their own knowledge about their body. On the other hand, as young dancers have limited experience, the staff discussed the importance to educate young dancers about the prevention of injuries. This dancer explained how experience can

**FIGURE 3** Two main injury prevention measures were derived from the focus group interviews: 1. Physical preparation to deal with load, and; 2. Load management. The interaction between communication, planning, team work, and experience influences the relative weight of these two arms of the balance.
play a role in injury prevention: “Some of us know what to do to prepare yourself. Because we’ve been there before. But it’s kind of unfair to expect that young dancers know how to prepare for a role that they haven’t done yet.”

A more detailed description of codes, respective quotes per theme, is presented as Supplementary Material.

4 | DISCUSSION

Our findings have captured multiple views from dancers, artistic, and medical staff regarding dance injuries and their prevention. By applying a qualitative method, we were able to see the injury prevention process through the “eyes” of dancers and staff. Our results highlight the diversity in perceptions of concepts that are considered definite, such as the concept of a “unique” gold-standard injury definition, the dynamic interaction of multiple injury risk factors, and injury prevention as a daily challenge.

Dancers and staff acknowledged a “gray area” when defining a dance injury, which is also described in the dance medicine literature to be a challenge.9,10 The IADMS consensus statement suggested to standardize the time loss definition as an injury definition, to facilitate the comparison of data across studies.9 However, a broader injury definition including pain and performance limitation might be more useful, allowing for early detection of health problems and potential injuries.23,24 A wide-ranging spectrum of how to define an injury was described by our participants, similar to the previous findings with elite athletes and circus artists.25,26 This idea is also present in previous dance medicine studies, showing that pain and injury are part of the dancer’s life and identity,17,18,27 which has repercussions in terms of the underreporting of injuries. The common denominator of those descriptions was the clear and objective threshold “not being able to dance,” which equals the concept of a time loss injury definition.10 However, for early detection of a health problem, the time loss definition is not sensitive enough, since it only gains insight into the more severe health problems. The Oslo Sports Trauma Research Center Questionnaire (OSTRCQ)28 allows to monitor multiple, less severe outcomes, such as pain, performance limitation, training modification, providing a comprehensive view of health problems. The OSTRCQ was already applied to prospectively monitor dancers’ health,10,29 but is not a widely applied monitoring tool. Additionally, to guarantee that the dancers report pain, it is necessary to establish an open and trustworthy communication between staff and dancers.30,31

Our findings described the imbalance between load and load capacity as the main factor related to the occurrence of injuries. Most risk factors reported by the participants were on the load side of the equation (eg, schedule, load consistency and repertoire). A recent study actually found a relationship between schedule, touring season and repertoire, and injury distribution during the season.24 A better planning may potentially improve workload distribution and influence the injury risk. Load management has been presented as an important concept to reduce injury risk in sports32 and in dance.34 The load was presented by participants as a complex phenomenon with many interrelated factors. For instance, the national collective labor agreement influences load consistency by regulating dancers’ working hours. The load consistency mentioned by our participants was also presented in a recent review, indicating higher injury rates during periods of transition with the recommendation to modify load for potential risk reduction.35 Future studies should explore the multiple and interrelated factors that modulate load and load capacity,36 as well how load management strategies can be applied to manage injury risk in the prevention of dance injuries.34

Communication and teamwork were frequently mentioned in the FG. Recently, the sports medicine literature has been raising attention to topics related to teamwork. Ekstrand et al showed how leadership and communication are related to injury occurrence.37,38 The need for teamwork indicates the importance of leadership39 and an integrated staff engaged in a comprehensive care of athletes40 and artists.26 The literature has been advocating for a more integrative and collaborative workforce to deal with sports injury prevention.41 However, no interventions targeting teamwork and communication have been described in the literature as a dedicated injury prevention intervention. Developing teamwork and communication strategies can be useful to prevent dance injuries.

Dancers start their career relatively young and are exposed to injury risk already at a young age. In a study with a group of young dancers (8-16 years old), nearly half had experienced at least 1 previous injury.42 The value of experience and the learning process of preventing injury found in our study was also reported in a recent qualitative paper.31 This stresses that “extra” care should be taken to guide young dancers toward injury prevention measures, already in the early stages of their career.

Although few factors related to load capacity were mentioned by participants, the most frequently described preventive strategy revolved around preparation, which modulates load capacity. Modifying load capacity and reducing the individual injury risk is one of the main targets of injury prevention in sports43 and in dance.13,14 However, it is contradictory that the factors related to load frequently described as injury factors were not described as part of injury prevention measures. Hence, although dancers acknowledge their responsibility to prevent injuries, it is intriguing that the main factors related to the occurrence of injuries, that is, load-related factors, are outside the dancers’ reach.

The trustworthiness of our findings was strengthened by applying methodological strategies. To increase the
credibility of our findings, we used triangulation of sources, by including dancers, artistic and medical staff. We also had independent coders analyzing the data separately. Regarding transferability, our participants are elite level professional dancers/staff in an international company. We consider this a strength, as elite international dance companies are underrepresented in current literature, most studies focus on pre-professional dancers, students and professionals of small companies.35 Also, differences in experience, backgrounds, and culture regarding injury prevention could have influenced our findings due to the diversity of our sample. On the other hand, such adversity reflects the composition of the group. Despite our guarantee of confidentiality, it is possible that some participants filtered their opinions, as they are company employees. It is also important to acknowledge that some opinions or ideas may remain unrevealed in a group discussion. Most of the participants were not native English speakers and might not be able to express ideas even though the company has English as the common language. Regarding gender representation, most of the participants in the staff’s FG were female. This reflects the actual gender distribution in the artistic team, while the gender distribution in the dancers’ group was more even reflecting the full cast.

5 | PERSPECTIVES

Our findings bring insights to assist the development of injury surveillance and injury prevention for dancers. While dancers and staff acknowledged the responsibility of the dancer regarding the prevention of injuries, some critical factors regarding injury risk reduction were found to be out of dancers’ hands, for example, the management of load. The multiple features of injury definition, as well as the dynamic and interrelated factors of injury prevention process presented in this study, indicate the complexity of the dance-related injury problem. Injury prevention was described as a team effort by our participants indicating the importance of communication as a tool to improve the injury prevention process. Some of the described critical factors of this complex context need to be the target for further development of dance medicine research and ultimately, for a comprehensive injury prevention approach.

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**SUPPORTING INFORMATION**
Additional supporting information may be found online in the Supporting Information section.

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