

Risk factors for lower extremity injuries among contemporary dance students

Christine van Seters, MD^{1,2}, Rogier M van Rijn, PhD¹, Marienke van Middelkoop, PhD², Janine H Stubbe, PhD^{1,3}

¹ Codarts, University of the Arts, Rotterdam, The Netherlands; ² Department of General practice, Erasmus MC, University Medical Center, Rotterdam, The Netherlands; ³ Amsterdam University of Applied Sciences, Centre for Applied Research in Sports and Nutrition Amsterdam, The Netherlands

Objectives Contemporary dance students are at high risk for injuries. The yearly overall risk of injuries in pre-professional contemporary dancers is more than 60%, with lower extremity injuries as the most predominant musculoskeletal injuries. The dynamic position of the knee and the strength in the lower extremity are considered to be a risk factor for injuries of the lower extremity. Therefore, the aim was to assess if lower extremity kinematics and strength are potential risk factors for sustaining lower extremity injuries in pre-professional contemporary dancers.

Design Prospective cohort study

Methods A total of 45 first year students of Bachelor Dance and Bachelor Dance Teacher were included. At the start of the academic year (2015/2016) the following potential risk factors were measured: age (years), gender, educational program, injury history (only lower extremity) in the prior year, BMI, lower extremity kinematics (single leg squat) and strength (countermovement jump). During the academic year injuries were prospectively recorded by means of a monthly questionnaire which consist the Oslo Sports Trauma Research Center (OSTRC) Questionnaire on Health Problems. The main outcome was a substantial lower extremity injury during the academic year defined as any problems leading to moderate or severe reductions in training volume or in performance, or complete inability to participate in dance at least once during follow-up. The average monthly prevalence of all- and substantial lower extremity injuries was calculated. Analyses on leg level were performed using Generalized Estimating Equations (GEE) to test the associations between substantial lower extremity injuries and the potential risk factors at baseline.

Results The one-year prevalence of lower extremity injuries was 82.2%. Of these 51.4% was a substantial lower extremity injury. The monthly prevalence of all lower extremity injuries ranged from 14.5% to 28.0% and from 4.4% to 12.2% for substantial lower extremity injuries. The univariate analyses showed a significant association between dorsal flexion of the ankle (OR 1.11; 95% CI 1.02 – 1.20) and substantial lower extremity injuries during follow-up. The multivariate analysis also showed a significant association between dorsal flexion of the ankle (OR 1.25; 95% CI 1.03 – 1.52 and the occurrence of substantial injuries. It is notable that students enrolled in the Bachelor Dance Teacher showed generally higher ORs, although not significant, for sustaining a lower extremity injury during the academic year compared to students enrolled in the Bachelor Dance. None of the other potential risk factors was univariate or multivariate associated with the outcome.

Conclusion The results of this study indicate that contemporary dance students are at high risk for lower extremity injuries. Having a limited dorsal ankle flexion is associated with sustaining a substantial lower extremity injury during the academic year.

Relevance for dance and music medicine The high demands make a dance student prone to lower extremity injuries, which can lead to medical treatment, and inhibit artistic development due to absence from dance activities. In extreme cases, they can lead to study delay and even dropping out of college. Insight in factors predicting substantial injuries enables us to enhance the prevention of dance related injuries.