

When do injuries occur in dance? a systematic review and discussion of training load

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Sports medicine research suggests that overuse injuries may result from inappropriate training load¹⁻². In dance research, overuse is estimated to be a factor in 75% of all injuries³. Training loads for dancers typically involve high repetition of extreme movement. Volume of training ranges from six to eight hours per day during rehearsal periods and up to ten hours during performance seasons⁴. Holiday periods, however, can last up to three months⁵⁻⁶. This systematic review identifies studies in ballet and contemporary dance that have investigated the relationship between injuries and their annual timing (AT) (for example, across a performance season, a semester, or a training or working year). Six electronic databases were searched up to June 3, 2016: PubMed, Embase, CINAHL, SPORTdiscus, Scopus, and the Performing Arts Database. Medical subject headings used in PubMed were “wounds and injuries”, “musculoskeletal diseases” and “dancing”. Keywords used were injur*, sprain, strain*, “muscul* dis*”, danc* and ballet. Only original data, and cohort studies in ballet and/or contemporary dance that report a relationship of injury to AT were included. 1196 abstracts were searched. Reference lists of identified studies were also searched. Two reviewers independently assessed each identified study for risk of bias using the Newcastle-Ottawa Scale (NOS) for Observational Studies⁷. An analysis of the identified studies was conducted on the relationship of injury and AT across potentially inflective changes in load, such as returning to dance after holiday periods, or transitioning from rehearsal periods to performance seasons, when working hours and cardiovascular demands may increase⁸⁻⁹. In the discussion of training load, findings in sports medicine of a relationship between change in training load and injury¹, and delay in injury presentation after acute spikes in training load¹⁰⁻¹¹ are highlighted as potentially relevant to dance, particularly as a guide to management of training loads. A useful metric, for example, may be to quantify training load as the product of the duration and intensity of training¹, which, to the authors’ knowledge has not been investigated in relation to injury in dance.

References

1. Drew M.K., Finch C.F. The relationship between training load and injury, illness,

- and soreness: a systematic and literature review. *Sports Med*, 2016; 46(6):861-883.
2. Gabbett T.J., Hulin B.T., Blanch P., Whiteley, R. High training workloads alone do not cause sports injuries: how you get there is the real issue. *Br J Sports Med*, 2016;50:444–445.
 3. Smith, P. J., Gerrie, B. J., Varner, K. E., McCulloch, P. C., Lintner, D. M., & Harris, J. D. Incidence and prevalence of musculoskeletal injury in ballet: a systematic review. *Orthop J Sports Med*, 2015;3(7).
 4. Wyon, M. Preparing to perform: periodization and dance. *J Dance Med Sci*, 2010;14(2):67-72.
 5. Bronner, S., Ojofeitimi, S., & Rose, D. Injuries in a modern dance company: effect of comprehensive management on injury incidence and time loss. *Am J Sports Med*, 2003;31(3):365-373.
 6. Solomon, R., Micheli, L. J., Solomon, J., & Kelley, T. The 'cost' of injuries in a professional ballet company: a three-year perspective. *Med Probl Perform Ar*, 1996;11(3):67-74.
 7. Wells G.A, Shea B, O'Connell D, Peterson, J., Welch, V., Losos, M., & Tugwell, P. The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. 2000. Available at: http://www.ohri.ca/programs/clinical_epidemiology/oxford.asp. Accessed 20 May 2016.
 8. Wyon, M.A, Abt, G., Redding, E., Head, A., & Sharp, C.C. Oxygen uptake during modern dance class, rehearsal, and performance. *J Strength Condit Res*, 2004;18(3):646–649.
 9. Wyon, M.A., & Redding, E. Cardiorespiratory adaptations during rehearsal and performance of contemporary dance. *J Strength Condit Res*, 2005;19(3):611-614.
 10. Orchard, J.W., Blanch, P., Paolini, J., Kountouris, A., Sims, K., Orchard J.J., & Brukner, P. Cricket fast bowling workload patterns as risk factors for tendon, muscle, bone and joint injuries. *Br J Sports Med*, 2015;49(16):1064-1068.
 11. Orchard, J.W., James, T., Portus, M., Kountouris, A., & Dennis, R. Fast bowlers in cricket demonstrate up to 3- to 4-week delay between high workloads and increased risk of injury. *Am J Sports Med*, 2009;37(6):1186-1192.