

14. Kongress für Tanzmedizin Frankfurt 1.-3. Juni 2018

lecture topic: The effects of a 10-week plyometric training intervention on jump performance in professional ballet dancers

Purpose: The aim of the study was to find out if a 10-week plyometric intervention program has a positive effect on jump performance of professional ballet dancers. **Study Design:** Field-based quantitative intervention study. **Method:** 11 (8 male, 3 female) professional ballet dancers between 19 and 34 years old (i.e. intervention group) participated in a 10-week plyometric intervention, consisting of one weekly lead training session from low to moderate and high plyometric exercises. 6 (3 male, 3 female) professional ballet dancers between 19 and 34 years old acted as a control group executing their normal daily routine. Pre- and post-tests were conducted under field conditions with a myotest device to monitor the effects of plyometric exercises on jump height, power, force, speed, contact time, reaction time and leg stiffness during counter movement jumps (CMJ), counter movement jumps on the right leg (CMJR), counter movement jumps on the left leg (CMJL) and plyometric jumps (PLJ), plyometric jumps on the right leg (PLJR), plyometric jumps on the left leg (PLJL) as well as jump distance in a dance-adapted long jump (jeté) following adapted procedures from Exner-Grave & Achtelik (2016). In addition, counter-movement jumps as well as plyometric jumps were analysed following an adapted landing error scoring system (LESS) as a helpful tool to evaluate possible knee-, hip-, foot malalignment (Padua, Di Stefano, Beutler, De la Motte, Di Stefano, M.J. & Marshall, 2015). The Kolmogorov-Smirnoff test showed not normally distributed data. Therefore, Mann-Whitney-U tests of the differences (i.e. post-test minus pre-test values) were performed to check for significant differences between the two groups. Wilcoxon tests was performed to check for significant differences between pre- and post-test parameters within the respective groups. **Results:** No significant differences were observed between the intervention and control groups following the intervention program as all p-values were bigger than 0.05. However, the Mann-Whitney-U tests showed significant differences between pre- and post test in the intervention group. In plyometric both legs jump height increased significantly ($p=0,013$) for 7.37% (mean value). In the counter-movement left leg jump speed increased significantly ($p=0.041$) for 6.70%. Plyometric jumps showed several significant increases: In plyometric both legs contact time ($p=0.021$) was reduced to -4, 81%, leg stiffness rised up to 14,39% ($p=0.010$). In plyometric right leg jumps contact time decreased for 7.67% ($p=0.003$) and leg stiffness increased for 16.86% ($p=0.008$). The left leg in contrast showed significant changes in contact time (-9.36%, $p=0.021$) only. Long jump left leg jeté rised significantly for 13.84% ($p=0.006$). **Conclusions:** Plyometric training in professional ballet dancers increases jump height and leg stiffness and reduces ground contact time. It is suggested to implement plyometric training into the weekly ballet training.

References:

Exner-Grave, E. & Achtelik, A. (2016). ESPL- Evaluation of the sportsspecific performance capacity. [PDF document]. Retrieved from Lecture Notes Online Web site: https://ilias.unibe.ch/ilias.php?ref_id=1011050&cmdClass=ilrepositorygui&cmdNode=u0&baseClass=ilRepositoryGUI

Padua, D. A., Di Stefano, L. J., Beutler, A. I., De la Motte, S. J., Di Stefano, M. J., & Marshall, S. W. (2015). The Landing Error Scoring System as a Screening Tool for an Anterior Cruciate Ligament Injury–Prevention Program in Elite-Youth Soccer Athletes. *Journal of Athletic Training*, 50(6), 589–595.