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Acute effects induced by verbal instructions in the biomechanics of the drop vertical jump performed from different drop heights

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Purpose: The Drop Vertical Jump (DVJ) is commonly used in explosive strength training and physical conditioning. Recently, it has also been applied as an exercise in the rehabilitation and prevention of injuries. The purpose of this study was to assess acutely the influence of different verbal instructions on the kinematics of DVJ performed from different drop heights in two experimental groups.

Method: Sixteen young female participated voluntarily in this study; one group was composed of 8 volleyball female players (VP) participating in the Italian national-Serie C (age 20.5 ± 3.3 years; height 1.70 ± 0.1 m; body mass 65.5 ± 11.2 kg and BMI 22.34 ± 2.21), while the other of 8 active sedentary young women (AC) (age 22.1 ± 1.6 years; height 1.65 ± 0.1 m; body mass 58.5 ± 4.4 kg and BMI 22.15 ± 1.41 kg/m²). Each participant performed 12 DVJ: 3 different heights (20, 30, 40 cm) with 4 different verbal instructions (“jump as high as possible (1A); “jump as quickly as possible” (2A); “jump as high as possible and during the landing try to damp the impact at ground contact” (1B); “jump as quickly as possible and during the landing try to damp the impact at ground contact” (2B). The range of motion (ROM) during flexion–extension of knee joint and anterior–posterior displacement of trunk were recorded by a 3D infrared camera (D-WALL TecnoBody).

Results: The ROM variation in the trials performed according to the verbal instructions 1B and 2B (with damping) compared to the trials 1A and 2A (without damping), were significantly higher in VP at knee (1B and 2B = 30 ± 1 ; 1A and 2A = 22 ± 4 ; $\Delta = 28\%$; $P < 0.05$) and

trunk (1B and 2B = 15 ± 2 ; 1A and 2A = 7 ± 2 ; $\Delta = 48\%$; $P < 0.05$) than the AS at knee (1B and 2B = 37 ± 5 ; 1A and 2A = 23 ± 5 ; $\Delta = 37\%$; $P < 0.05$) and trunk (1B and 2B = 16 ± 2 ; 1A and 2A = 10 ± 3 ; $\Delta = 39\%$; $P < 0.05$). The ROM variation at the knee was significant between the two groups during the push-off-phase in the trials 20-2B [VP (72 ± 16) vs. AS (14 ± 26); ($\Delta\% = 43$; $P < 0.05$)], 30-2B [VP (65 ± 26) vs. AS (40 ± 15); ($\Delta\% = 40$; $P < 0.05$)] and 40-2B [VP (84 ± 21) vs. AS (51 ± 17); ($\Delta = 40\%$; $P < 0.05$)].

Conclusion: The results of the present investigation suggest that the kinematic parameters of DVJ, during the push-off phase and landing, performed from different drop heights were influenced by the different verbal instructions given to the participants. There were significant differences within and between the two groups.

References

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