ABSTRACT

Background: Smartphone usage among university students during physical activities can hinder dynamic balance and reaction time due to divided attention. Although the negative impacts of unstructured multitasking are established, the potential benefits of structured smartphone-based dual-task training as a cognitive-motor intervention in healthy young adults need further investigation.

Aim: To determine the effect of a four-week smartphone-based dual-task training Programme on dynamic balance and visual reaction time in healthy university students.

Methodology: A pre-experimental single-group pre-test post-test design was conducted with thirty healthy university students (mean age 22.1 ± 1.4 years; 15 males, 15 females) from Brainware University, Barasat. Participants engaged in a four-week dual-task training protocol involving smartphone-based cognitive tasks alongside dynamic physical activities, conducted five times a week for 25–30 minutes. The outcomes measured included the Y-Balance Test for dynamic balance, the Timed Up and Go (TUG) test for functional mobility, and a computerized Visual Reaction Time (VRT) test. Data analysis was performed using paired t-tests in SPSS v26 with significance set at $p < 0.05$.

Results: Significant improvements were observed across all outcome measures following the intervention. YBT right composite improved from 84.51±16.12% to 89.60±16.84% (mean difference: +5.09%, $p < 0.001$); YBT left composite from 81.57±16.42% to 86.53±17.58% (mean difference: +4.96%, $p < 0.001$). TUG time decreased from 8.12±0.90 s to 7.57±0.93 s (mean difference: −0.55 s, $p < 0.001$), and VRT improved from 0.588±0.116 s to 0.530±0.114 s (mean difference: −0.058 s, $p < 0.001$).

Conclusion: A structured four-week smartphone-based dual-task training program significantly enhanced dynamic balance and reaction time in healthy university students, supporting the integration of cognitive-motor dual-task approaches into physiotherapy for balance improvement and injury prevention in young adults.

Keywords: *Dual-task training, dynamic balance, reaction time, Y-Balance Test, smartphone, university students, cognitive-motor training.*

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