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THE EFFECT OF DIFFERENT BIOFEEDBACK TECHNIQUES ON THE LEVEL OF MUSCLE ACTIVATION AND POSTURAL BALANCE IN YOUNG ADULTS

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Background: Visual biofeedback of postural sway has been shown to optimize postural balance by reducing postural sway during quiet standing. However, it is not yet fully known whether the reduction of postural sway from biofeedback is associated with the increase of postural muscle effort during standing balance.
Objectives: To investigate the effect of different types of visual biofeedback of postural sway on muscle activity and postural balance during standing balance in young adults.
Methods: Twenty-two participants (14 women and 8 men; mean ± standard deviation: 30.44 ± 6.76 years; body mass: 77.56 ± 19.47 kg; height: 1.70 ± 0.11 m; BMI: 26.42 ± 4.94 kg/m2) participated in this cross-sectional study and performed four postural tasks on the force platform for 60 seconds: 1) No biofeedback (control); 2) Centre of pressure (CoP) Biofeedback; 3) Biofeedback by portable laser, controlled by both wrist movement and body movement. The root mean square (RMS) amplitude of the surface electromyogram (EMG) collected from the right medial gastrocnemius and anterior tibialis muscles, and the standard deviation of the CoP displacement in the anteroposterior (AP) and mediolateral (ML) directions were analyzed. . The Friedman test (Shapiro-Wilk, $P < 0.05$) was applied to assess the main effect of the biofeedback on RMS amplitude and CoP standard deviation, followed by the Wilcoxon test for pairwise comparisons (significance level of 5%).
Results: The RMS amplitude (median; interquartile range) of the tibialis anterior was greater in the wrist laser (46.0; 30.0 μV) and posturography biofeedback (44.0; 25.0 μV) tasks, when compared with the condition without biofeedback (39.0; 13.0 μV) ($P < 0.05$). For the medial gastrocnemius, no main effect of task was found for the RMS amplitude ($P = 0.837$). When compared to without biofeedback (7.071; 2.693 mm), the standard deviation of CoP displacement in the AP direction was greater in the body laser (9.585; 6.097 mm) and wrist laser (8.272; 3.307 mm) and, lower in CoP biofeedback (5.858; 2.248 mm). In the ML direction, no differences in the standard deviation of CoP displacement were found between the tasks ($P = 0.169$).
Conclusion: Different types of biofeedback appear to lead to increased muscular effort at the ankle in the orthostatic position.
Implications: Balance rehabilitation and training strategies should consider the specific training objectives and the neuromuscular responsiveness of individuals when choosing the biofeedback to be used.
Keywords: Biofeedback, Electromyography, Postural Control

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ANXIETY AND LIFESTYLE: A CROSS-SECTIONAL STUDY OF BRAZILIAN UNIVERSITY STUDENTS

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Background: Anxiety is a common mental disorder, with a prevalence of 301.4 million cases worldwide and 18.6 million cases in Brazil. Lifestyle factors are associated with mental disorders and are considered both risk factors and potential interventions. Understanding the lifestyle of those with anxiety symptoms, particularly young people, can guide the development of proper screening and approaches in this area.
Objectives: Describe lifestyle characteristics of university students with anxiety symptoms and compare whether these characteristics differ between those with and without symptoms.
Methods: This cross-sectional study is part of the UNIversity students' LIFEstyle behaviors and Mental health (UNILIFE-M) cohort investigating the associations between university students' lifestyle behaviors and mental health symptoms. We used baseline data from participants from 13 federal universities in Brazil (2023 to 2024). Screening for anxiety symptoms was conducted with the Generalized Anxiety Disorder Questionnaire (GAD-7) (7-item, 0-21), where scores = 10 indicate the presence of symptoms. Lifestyle was measured using the Short Multidimensional Inventory Lifestyle Evaluation for University Students (U-SMILE) (24-item, 7-96), where higher scores indicate a healthier lifestyle across the seven domains (diet, substance use, physical activity, stress management, sleep, social support, and environmental exposures). Means and standard deviations were reported. We used different tests to compare the overall lifestyle and its domains between individuals with and without anxiety symptoms according to Levene's test. The Mann-Whitney U test was used for substance use, social support, and environmental exposure domains and the Student's t-test was used for the remaining domains.
Results: We included 6371 undergraduate students (60.5% were female, mean age of 19.9 (±3.19) years). From total valid responses, 2834 individuals (49.9%) were screened positive for anxiety symptoms, with a total lifestyle score of 62.3 (±7.39). The highest-scoring domains were substance use, with a mean score of 15.2 (±1.38) out of 16 (95%), social support with 16.1 (±3.02) out of 20 (80.5%), and diet with 7.7 (±1.61) out of 12 (64.7%). In contrast, the lowest-scoring domains were stress management with 4.0 (±1.57) out of 8 (50%), environmental exposures with 8.7 (±2.17) out of 16 (54.3%), physical activity with 7.6 (±2.51) out of 12 (63.8%) and sleep with 7.6 (±1.99) out of 12 (63.8%). Students with anxiety symptoms presented a less healthy lifestyle compared to those without it (67.0; ±7.47). The mean difference in total lifestyle score was statistically significant (4.74; $p < .001$; 95%CI 4.34 to 5.13) with a moderate effect size (Cohen's $d = 0.638$; 95%CI 0.58 to 0.69). Separately, significant differences were found in all domains except for stress management.
Conclusion: Students with anxiety symptoms had low lifestyle scores in the stress management, environmental exposures, physical activity, and sleep domains. Overall, their lifestyle was less healthy compared to individuals without anxiety symptoms.