METHODS: Adults (N=165 [98 female]; 20-45 yrs) wore hip-worn ActiGraph wGT3X+ accelerometers to measure physical activity. MVPA was defined using Troiano cut-points. Behavioral outcomes were recorded during the Eriksen Flanker task to assess attentional inhibition. EEG recordings were taken to elucidate response- and stimulus-locked LRPs at the C3 and C4 electrodes. Participants were separated into groups based on the BMI cutoff of $30kg/m^2$ i.e., non-obese (n= 88) and obese (n=77). Partial Pearson correlations controlling for age, sex, wear time, and handedness were conducted in each group to determine if MVPA was associated with the response- and stimulus-locked LRP amplitudes and latencies.

RESULTS: Average MVPA was significantly different (P=0.002) between the non-obese (41.8 $\pm$ 25.0 min/day) and the obese group (31.2 $\pm$ 17.7 min/day). Average congruent (P=0.017) and incongruent (P=0.005) accuracies were significantly different between each group. MVPA was related to incongruent accuracy (r=0.311, P=0.004) but not congruent (r=0.161, P=0.143) in the non-obese group. There were no relationships between MVPA and response- or stimulus-locked LRPs in the non-obese group. However, in participants with obesity, MVPA was associated with response-locked congruent (r=0.251, P=0.032) and incongruent (r=0.260; P=0.026) mean amplitude, and stimulus-locked congruent mean amplitude (r=0.301, P=0.013).

CONCLUSION: MVPA was associated with pre-motor planning and activation in people with obesity. Future work should study the impact of physical activity on neuroelectric indices of motor response preparation in people with obesity.

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CrossFit Participants And Collegiate Athletes Exhibit Consistent Differences In Hydration Parameters

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Collegiate athletics programs and CrossFit facilities are environments that are associated with intense, competitive, and highly structured resistance training. Although the characteristics of stress are unique to each setting, maintenance of hydration is important to the health and performance of both exercising populations.

PURPOSE: To examine differences in hydration parameters between Division I collegiate athletes and consistent CrossFit participants.

METHODS: We scanned 288 women (28.5% athletes) and 244 men (13.1% athletes) using the InBody 770 bioelectrical impedance analyzer (InBody USA, Cerritos, CA). There were 7 women's sports and 6 men's sports represented. We used coarsened exact matching to generate subsamples that were matched for sex, age, and bodyweight; 96 subjects were retained (48 Division I athletes, 48 CrossFit members). This was considered the study sample. Multiple linear regression models, holding height and body fat percent constant, tested for differences in total body water (TBW), intracellular water (ICW), and extracellular water (ECW). Significance was set at p < 0.05.

RESULTS: Across the study sample, subject age was 21.7 ± 3.1 yr, height was 68.2 ± 4.0 in, weight was 169.8 ± 28.0 lb, body fat percent was 20.4 ± 10.0%, TBW was 98.4 ± 18.7 lb, ICW was 62.2 ± 12.0 lb, and ECW was 36.2 ± 6.7 lb. Holding constant height and body fat percent, linear regression revealed CrossFit participants to have an additional 8.2 lb of TBW (p < 0.001; 95% CI: 3.8 to 12.6); the overall model was significant (p < 0.001; r^2 = 0.754). Assessment of individual fluid compartments revealed CrossFit participants to have 5.3 lb more ICW (p = 0.001; 95% CI: 2.3 to 8.2) and 2.9 lb more ECW (p < 0.001; 95% CI: 1.4 to 4.4). Both models were significant (p < 0.001; ICW r^2 = 0.735; ECW r^2 = 0.781).

CONCLUSIONS: After matching samples for sex, age, and bodyweight, and holding height and body fat percent constant, CrossFit participants emerged with significantly higher values in TBW, ICW, and ECW. Although universities generally employ supervisory staff to monitor athlete training, our results indicate that competitive athletes may be less hydrated than other exercising populations. More focus on hydration practices may be warranted at the collegiate level.

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Impact Of 8-week Combined Group Exercise Program On Individuals With Down Syndrome

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PURPOSE: The goal of this study was to examine the physical impact of an 8-week group fitness intervention program for individuals with Down syndrome. This study was set in place to examine an already existing group fitness program for people with Down syndrome to see if this population is positively impacted through a group training program. It also was used to examine the effectiveness of the program set in place.

METHODS: Data was collected on willing 12-30-year-old males and females with Down syndrome (age: 16.9 ± 2.9 years, height: 143.9 ± 10.8 cm, weight: 57.0 ± 9.8 kg). Twelve participants completed the 8-week fitness program (duration 45-60 minutes per session). The fitness program was a combined group exercise program (i.e., resistance and cardiovascular exercise) consisted of exercise involving body weight, band work, jump rope, and small free weights. This fitness class was performed once a week for 8 weeks. Participants exercised at generally light-to-moderate intensity heart rate range. Baseline and post-testing examinations were aerobic and muscular endurance tests (i.e., step test, chair sit-to-stand, 6-minute walk) and flexibility and body composition tests (i.e., flexibility sit-and-reach, waist-to-hip measurements).

RESULTS: There was a significant aerobic improvement post-exercise intervention for the step test (p<0.05). There was no significant difference between pre- and post-intervention for the chair sit-to-stand, 6-minute walk, flexibility, or waist-to-hip measurement (p>0.05).

CONCLUSION: An 8-week light-to-moderate combined training intervention is a great enough stimulus to significantly increase some facets of cardiovascular fitness in people with Down syndrome. Therefore, implementing combined training specifically into an individual's weekly routine for people with Down syndrome is a viable option to increase fitness, which could then improve overall quality of life and independence. This has also allowed the specific facility to understand their current programming effectiveness for this population.

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Effects Of Head Mounted Virtual Reality Gaming On Trunk Muscle Activation In Healthy Adults

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PURPOSE: Virtual reality (VR) gaming allows for active exercises using body weight, dynamic postures, and extremity movements to create a training stimulus. The ability to profile training stimulus quantitatively is critical for guiding patient-specific training or rehabilitative interventions. Electromyography (EMG) has been used to create informative profiles of muscle activation responses associated with VR gaming; however, mixed findings suggest the need to account for additional stimulus parameters. The purpose of this study was to evaluate the effect of posture on trunk muscle activation responses during VR gaming.

METHODS: EMG sensors were placed over the rectus abdominis (ABD), internal oblique (IO), external oblique (EO), and erector spinae (ES). 20 healthy adult participants (9 male, 11 female), age 24.65±2.76 years played 3 one-minute rounds of a VR game in 3 different postures: short sitting (SS), sitting on a stability ball (SB), and standing (ST). EMG signals acquired during gaming were exported as %MVIC. For each muscle, we calculated time-in-zone (TIZ) and maximum consecutive blocks (MCB) using previously described methods (de Vries et al. 2020). TIZ is the percentage of trial time spent in excess of 60% MVIC and MCB is an indicator of prolonged muscle activity ("blocks" = 200 ms). Effects of posture on TIZ and MCB were analyzed using one-way ANOVAs with repeated measures. Significant ANOVAs were followed with pairwise t-tests.

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