PURPOSE: Inadequate sleep is a known risk factor for injury, but the mechanisms by which sleep restriction increases injury risk remain unknown. The purpose of this study was to determine if running mechanics during an exhaustive run, including average peak impact accelerations between the tibia and the forehead, would be altered following one night of sleep restriction.

METHODS: Two male and seven female subjects (21 ± 3yrs, 55 ± 10kg) completed an exhaustive treadmill run following either 8 hours (well-rested, WR) or 3 hours of sleep (sleep-restricted, SR) in a randomized crossover design, separated by at least one week. The exhaustive treadmill run was performed at an intensity equal to the subject’s ventilatory threshold until volitional fatigue. Wireless inertial measurement units (IMUs) were placed on the right tibia and forehead. Average right tibia peak impact accelerations (RPk), average head peak impact accelerations (HpIk), and shock attenuation (ratio of RPk to HpIk) were measured for 3 minutes during the first 2.5 minutes and final 3 minutes. Paired t-tests were used to compare each dependent variable (shock attenuation, RpIk, HpIk) between conditions (WR vs SR).

RESULTS: Time to exhaustion during the exhaustive treadmill test was not significantly different between the WR and SR conditions respectively (38.5 ± 15.3 minutes, 40.0 ± 14.7 minutes, p = 0.69). There were no significant differences in shock attenuation between conditions during the first 2.5 minutes (WR: 58.96 ± 8.09, SR: 57.72 ± 7.33, p = 0.55) and final 3 minutes (WR: 58.00 ± 8.73, SR: 57.53 ± 7.58, p = 0.84). No significant differences were found between conditions for RpIk (WR: 5.19 ± 0.73g, SR: 5.07 ± 0.92g, p = 0.49; WR: 5.38 ± 0.87g, SR: 5.29 ± 0.96g, p = 0.64) and HpIk (WR: 2.12 ± 0.44g, SR: 2.11 ± 0.37g, p = 0.79; WR: 2.22 ± 0.45g, SR: 2.20 ± 0.36g, p = 0.76) during the first 2.5 minutes and final 3 minutes respectively.

CONCLUSION: Running mechanics were not altered following one night of sleep restriction. These data suggest that one night of inadequate sleep is not sufficient to alter running mechanics, however more research is needed to understand the possible effects of chronic sleep restriction and its potential influence on injury risk during running.

D-71b Free Communication/Poster - Sports Medicine Fellow Research Abstracts

2147 Board #303 May 30 3:30 PM - 5:00 PM
Landiing Mechanics And Muscular Strength Are Not Altered Following Acute Sleep Restriction
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(No relationships reported)

PURPOSE: Inadequate sleep is associated with an increased risk of injury, however it is unknown what physical risk factors for injury are alterred by inadequate sleep. We hypothesized that one night of sleep restriction would affect reaction times and landing mechanics but not leg strength.

METHODS: Ten healthy subjects (5 males, 5 females, 21±3 yrs, 1.67±0.11m, 59.8±11.8kg) completed cognitive testing, strength testing and a series of jump assessments following 8 hours (well-rested, WR) or 3 hours of sleep (sleep-restricted, SR) in a randomized crossover design. Subjects woke at the same time for each assessment and testing was conducted at the same time of day, in the same order, and separated by at least one week. Reaction time was assessed using the computerized Automated Neuropsychological Assessment Metrics (ANAM) assessment. Strength testing (isokinetic dynamometer) and balance testing was performed on both legs. VGRF and PkKF were captured using 3D motion capture. Vertical ground reaction forces (VGRF) for each leg were captured with two flush mounted force plates.

RESULTS: There were no significant differences between conditions for reaction time (p=0.894), or KE (p=0.882, p=0.568) and KF (p=0.295, p=0.156) in the left or right legs respectively. VGRF was not significantly different between the WR and SR conditions during the single leg stop-jump task (all p>0.362).

CONCLUSIONS: Inadequate sleep is associated with an increased risk of injury, however it is unknown what physical risk factors for injury are altered by inadequate sleep. These data suggest that one night of inadequate sleep is not sufficient to alter running mechanics, however more research is needed to understand the possible effects of chronic sleep restriction and its potential influence on injury risk during running.

2148 Board #304 May 30 3:30 PM - 5:00 PM
Parameters Associated With Abnormal Cardiac Conditions in Adolescent Athletes: Analysis using Simon's Heart Heartbytes Registry
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(No relationships reported)

PURPOSE: To determine clinical parameters that are related to abnormal cardiac conditions in the physically active youth.

METHODS: We used the Simon's Heart Heartbytes National Youth Cardiac Registry to collect cardiac related data from middle and high school athletes in southeastern Pennsylvania. We collected age, race/ethnicity, symptoms suggestive of abnormal cardiac conditions, past medical history, medication use, caffeine intake and family history. We also obtained height, weight, blood pressure, and cardiac murmur findings, as well as an ECG in all individuals. Binary logistic regression analysis was performed to identify an independent association between abnormal cardiac symptoms and potential indicators (all collected variables). The odds ratio (OR), 95% confidence interval (95% CI), and p-values were used as critical statistical values.

RESULTS: There were a total of 887 athletes (543 males and 344 females, age=16.9±2.1, height=66.9±11.4, weight=62.0±16.0). There was an independent association between abnormal symptoms and presence of significant past medical history (OR: 4.75, 95% CI: 3.17, 7.10, p<0.001) and prescribed medication use (OR: 1.71, 95% CI: 1.04, 2.79, p=0.034). Although the association between the presence of abnormal symptoms and African-American race (OR:2.01, 95% CI: 0.95, 4.28, p=0.069) and prescribed medication use (OR: 1.71, 95% CI: 1.04, 2.79, p=0.034) were observed during the single leg stop-jump task, as well as 5 trials on each leg of a single leg stop-jump task. Peak knee flexion angles (PkKF) were captured using 3D motion capture. Vertical ground reaction forces (VGRF) for each leg were captured with two flush mounted force plates.

RESULTS: No significant differences in strength and landing mechanics were observed following one night of sleep restriction. Knee flexion angle data trends suggest additional nights or chronic sleep restriction may be required to significantly alter movement mechanics.

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2149 Board #305 May 30 3:30 PM - 5:00 PM
Evaluation of Shoulder Health of Collegiate Wheelchair Basketball Athletes
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Shoulder pain is the most commonly reported musculoskeletal complaint among manual wheelchair users. Wheelchair basketball athletes may be at a higher risk of shoulder injury given the additional demands of their sport, but there is little research on the prevalence of shoulder injuries in this population. Shoulder injuries affect both sport participation and ability to perform activities of daily living for manual wheelchair users. Identifying shoulder injuries in wheelchair basketball athletes is important to provide better context in injury treatment and prevention.

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