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Competing In A Big City: Effects Of Air Pollution On Performance And Physiological Parameters During A 50-km Cycling Time-trial

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(No relationships reported)

PURPOSE: Air pollution is one of the main health risks caused by the environment. Exposure to particulate matter smaller than 2.5 microns in diameter (PM_{2.5}) leads to an increase in risk for cardiovascular and respiratory disease. Although many major sporting events are held in large, polluted cities (e.g. the Beijing 2008 and Rio 2016 Olympic Games), the effects of air pollution on performance and physiological parameters during endurance exercise remain unclear. Most laboratory research uses simulated air pollution which is not representative of actual "real-world" pollution exposure. Therefore, the aim of the current study was to investigate the effect of atmospheric air pollution on performance and physiological parameters during endurance exercise using "real-world" air pollution.

METHODS: Ten trained cyclists completed, in a counterbalanced order, two simulated 50-km cycling time-trials (50km-TT). These sessions were carried out in a modified shipping container capable of providing either a clean (filtered air) or polluted (ambient São Paulo air) environment. This design ensured that the participants were blinded to the polluted [POL] and filtered air [FA] conditions. Venous blood gas analysis was performed on 1mL samples taken from the forearm.

RESULTS: There were no differences in the performance in 50km-TT (FA= 90.4 ±5.8 vs. POL= 90.3±4.3 minutes, p=0.93). The power output was not different (FA= 200.2±30.4 vs. POL= 199.3±24 Watts, p=0.90). However, the inhaled PM_{2.5} was increased in polluted ambient (FA= 66.5±29 vs. POL= 222±62, p= <0.0001). In addition, the venous blood pO₂ and pCO₂ were not different between the two conditions.

CONCLUSIONS: Our findings showed that "real-world" air pollution exposure during a 50-km simulated TT exposure did not affect performance and physiological parameters.

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Practice Within 24 Hours Of Competitive Play Compromises Performance In Collegiate Basketball

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The NCAA regulates collegiate basketball practice schedules, imposing limitations on daily and weekly practice duration. Coaches seldom schedule fewer hours than permitted and commonly maximize participation within those limitations. There is reason to wonder: does maximum engagement correspond to optimal preparation?

PURPOSE: To test the effect of pre-game practice on in-game performance in women's collegiate basketball.

METHODS: We analyzed 15 female basketball players on an NCAA D1 team throughout the 2018-2019 season. Heart rate monitors and GPS trackers were worn during all games (n=33) and practices. Data collected were maximum heart rate (HR_{max}) and total distance moved in games and practices, whether the team won, win-loss margin, and individual athlete rebounds and points scored per game. Paired-samples t-tests, linear regressions, and logistic regressions tested the effect of pre-game practice on in-game performance.

RESULTS: The analyzed team won 60.6% of games. When practice was performed within 24hr of a game, winning percentage was 33.3% compared to 70.8% in games without prior practice (p<0.001). Holding constant the opponent's rank (p<0.001) and whether it was a home game (p<0.001), practicing within 24hr of competition reduced the odds of winning by 98.2% (p<0.001; 95% CI of OR: 0.007 to 0.049) and reduced the win-loss margin by 4.7 points (p=0.001; 95% CI: -7.398 to -1.962). During games, players ran 6,735.1 ± 2,268.4 meters and had a HR_{max} of 98.6 ± 9.3. There was no difference in HR_{max} during practices that did and did not occur within 24hr of a game (p=0.598). During games, HR_{max} was elevated 2.4 bpm if practice occurred in the previous 24hr (p=0.045; 95% CI: -4.6 to -0.1) despite no difference in on-court movement (p=0.243). Holding confounding variables constant, practicing within 24hr prior predicted trends for each player to score 1.8 fewer points (p=0.067; 95% CI: -3.7 to 0.1) and accomplish 0.9 fewer rebounds (p=0.079; 95% CI: -1.8 to 0.1).

CONCLUSION: These data do not support a "more is better" approach to collegiate basketball practice schedules. When practice occurs within 24hr of a game, despite elevated in-game cardiovascular effort of the athletes, individual and team performances are compromised.

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The Effects Of Kinesio Tape On Throwing Velocity And Accuracy In Collegiate Softball Players

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(No relationships reported)

The act of overhead throwing is a series of complex tasks that require synergy between multiple joints and muscle groups, lack of this synergy may lead to a decrease in performance and injury over time. In recent years, Kinesio tape has gained popularity as modality for the treatment and prevention of some of these injuries. To date, there is little research that looks at the use of Kinesio Tape in female athletes during the dynamic movement of overhead throwing.

PURPOSE: The purpose of this study was to investigate the effects of Kinesio Tape on throwing velocity, accuracy and range of motion, and angle of ball release after the application of Kinesio Tape.

METHODS: NCAA Division II softball players (n=9) participated in this study. The study was a randomized crossover design, subjects were either allocated to the control group (no Kinesio Tape) or the experimental group (Kinesio Tape) at their first testing session and then switched for the second testing session. Each subject performed 15 overhead throws approximately 20 feet from the target. Velocity, range of motion and angle of ball release were measured using Dartfish software, and accuracy was calculated based on points earned for hitting different levels of concentric rings.

RESULTS: Statistical analysis revealed no significant differences between all variables between the experimental and control conditions. However, when looking at the means there was an interesting trend in the data. Kinesio Taping showed an increase in throwing velocity of .69 m/s (21.3 m/s to 21.99m/s, p=0.480). There was a 92.78-point increase in throwing accuracy from the control, 81.11 points to 173.83 in the experimental group (p=0.092). The Kinesio Taping condition also demonstrated an increase in maximal external rotation from 79.74° to 86.11° (p=0.621). Finally, there was a 1.17° increase in the angle of ball release with Kinesio Taping (148.68° to 149.85°, p=0.732).

CONCLUSION: In conclusion, there was an increase in throwing velocity, accuracy and range of motion with the addition of Kinesio Tape during overhand throwing in collegiate softball players. Although the data did not present as statistically significant, it does demonstrate that Kinesio Tape may be a practical way to improve performance.