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Fetal Heart Rate During Moderate to High Intensity Resistance Exercise in Pregnant Women

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Fetal heart rate (FHR) is an indicator of fetal stress and has been observed following high intensity aerobic training (>90% Vo₂max), but the effects of resistance training are relatively unknown. **Purpose:** The purpose of this study was to investigate a progressive resistance exercise program on FHR. It was hypothesized that FHR would stay below the 160 beats per minute (BPM) threshold at intensities up to 85% max. A second exploratory aim was to compare FHR response between physically active and sedentary pregnant women to determine if training status influences degree of change during exercise. **Methods:** Healthy pregnant women between 28-32 weeks gestation were recruited to participate. Participants attended three visits over two weeks. Visit 1 included a physical activity questionnaire and exercise familiarization for the squat, incline bench, deadlift, lat pull down (LPD), leg press, and seated row. Visit 2 included 8-RM testing for each exercise. On Visit 3, participants performed 3 sets of 8 repetitions at 50% 8RM, 75% 8RM, and 85% 8RM. Maternal heart rate (MHR) and FHR were recorded after each set, and blood pressure after each exercise. If FHR dropped below 120 BPM or exceeded 160 BPM for greater than 1 minute, the exercise was discontinued. Descriptive statistics, Shapiro-Wilk normality tests, and MANOVAS were used to analyze the data and compare groups. **Results:** Thirty pregnant women participated in the study (31.8 ± 4 yo, pre-pregnancy BMI 24.6 ± 5.5). Sixteen of the 30 women were frequent exercisers (>150 min MVPA/wk) while the rest were not physically active (<90 min MVPA/wk). FHR exceeded 160 BPM in 10 participants but was transient and no participant experienced fetal tachycardia for >1 minute or experienced any other adverse complications. Of the 13 occurrences (3 participants experienced fetal tachycardia twice) 4 occurred after the LPD, 6 after the row, 2 after the deadlift and 1 after the leg press. The active group had a lower resting MHR ($p=0.063$), and a lower FHR change during the squat ($p=0.060$) and the LPD ($p=0.058$). For all other exercises, neither MHR change nor FHR change was different between groups ($p>0.05$). **Conclusion:** Fetal heart rate can increase following resistance exercise >75% max but is transient and returns to normal levels following exercise cessation. Similar MHR and FHR responses were observed for most of the exercises between groups, but the inactive group experienced a greater FHR increase in the squat and LPD exercise. The LPD and row exercise appear to cause greater increases in fetal heart rate possibly due to the increased intrathoracic and intraabdominal pressure produced by the exercise. **Significance:** Results from this study support the safety of resistance exercise up to 85% max on FHR and highlight that being physically active during pregnancy positively influences cardiovascular dynamics to exercise stress.

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