[Early Hum Dev.](https://www.ncbi.nlm.nih.gov/pubmed/20356690" \o "Early human development.) 2010 Apr;86(4):213-7. doi: 10.1016/j.earlhumdev.2010.03.002. Epub 2010 Mar 30.

**Aerobic exercise during pregnancy influences fetal cardiac autonomic control of heart rate and heart rate variability.**

[May LE](https://www.ncbi.nlm.nih.gov/pubmed/?term=May%20LE%5BAuthor%5D&cauthor=true&cauthor_uid=20356690)1, [Glaros A](https://www.ncbi.nlm.nih.gov/pubmed/?term=Glaros%20A%5BAuthor%5D&cauthor=true&cauthor_uid=20356690), [Yeh HW](https://www.ncbi.nlm.nih.gov/pubmed/?term=Yeh%20HW%5BAuthor%5D&cauthor=true&cauthor_uid=20356690), [Clapp JF 3rd](https://www.ncbi.nlm.nih.gov/pubmed/?term=Clapp%20JF%203rd%5BAuthor%5D&cauthor=true&cauthor_uid=20356690), [Gustafson KM](https://www.ncbi.nlm.nih.gov/pubmed/?term=Gustafson%20KM%5BAuthor%5D&cauthor=true&cauthor_uid=20356690).

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**Abstract**

**BACKGROUND:**

Previous studies using ultrasound technology showed that fetal heart rate (HR) may be responsive to maternal aerobic exercise. Although it is recognized that cardiac autonomic control may be influenced by the intrauterine environment, little is known about how maternal exercise affects fetal heart development.

**AIMS:**

This study tested the hypothesis that regular maternal exercise throughout gestation influences fetal cardiac autonomic control of HR and heart rate variability (HRV) when compared to fetuses of non-exercising women.

**STUDY DESIGN:**

Magnetocardiograms (MCGs) were recorded using a dedicated fetal biomagnetometer at 28, 32 and 36 weeks gestational age (GA) from 26 regularly exercising (>30 min of aerobic exercise, 3x per week) and 35 healthy, non-exercising pregnant women. Fetal MCG was isolated and normal R-peaks were marked to derive fetal HR and HRV in the time and frequency domains. We applied a mixed-effects model to investigate the effects of exercise, GA and fetal activity state.

**RESULTS:**

At 36 weeks GA, during the active fetal state, fetal HR was significantly lower in the exercise group (p=<0.0006). Post-hoc comparisons showed significantly increased HRV in the exercise group during the active fetal state at 36 weeks GA for both time and frequency domain measures.

**CONCLUSION:**

These results indicate that regular maternal exercise throughout gestation results in significantly lower fetal HR and increased HRV.

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