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**Towards improving uterine electrical activity modeling and electrohysterography:  
ultrasonic quantification of uterine movements during labor**

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**Abstract**

The electrohysterogram is a potential new tool for diagnosing preterm labor. Parameters from the electrohysterogram may be influenced by uterine movement. An observational study was performed quantifying uterine movement during labor as a step towards improving electrohysterogram analysis for predicting preterm labor. The uterine wall was continuously tracked by ultrasound imaging during first stage of labor while an accelerometer recorded external abdominal accelerations in six women. A cyclic cranial-caudal movement of the uterine wall, caused by maternal respiration, was observed. This is reported and quantified for the first time. Average frequency, amplitude, and peak speed were  $0.27 \pm 0.07$  Hz,  $0.68 \pm 0.84$  cm, and  $1.04 \pm 1.20$  cm/s, respectively. The accelerometer signal correlated with uterine movement and therefore can possibly provide a reference for removing movement-induced artifacts. There is a need to model and measure the effect of uterine movement on the electrohysterogram parameters and make measurements more robust to movement artifacts.