

Proof-of-concept study shows potential for using ultrasound to detect early signs of preterm labor

August 18 2015, by Matt Shipman



Researchers from North Carolina State University, Institut Langevin and Paris-Descartes University have conducted a proof-of-concept study that raises the possibility of using ultrasound techniques to detect cervical stiffness changes that indicate an increased risk of preterm labor in pregnant women. While additional work needs to be done, it may ultimately give doctors a new tool for determining when to provide treatment that can prevent preterm birth.

Premature births can mean low birth weights and other medical problems for newborns, but there are steps that doctors can take to

reduce the chances of [premature birth](#) if early warning signs are detected. One of those early symptoms is a softening of the cervix. Traditionally, this stiffness is assessed by manually palpating the cervix.

"But that's a subjective measure, and we wanted to determine if ultrasound could be used to quantitatively assess how stiff the cervix is – and, by extension, whether a woman is at risk of going into labor prematurely," says Marie Muller, an assistant professor of mechanical engineering at NC State and lead author of a paper describing the work.

Muller and her colleagues decided to try a technique called shear wave elastography (SWE), which was developed to assess tissue stiffness for cancer diagnosis. They reasoned that if SWE worked for detecting changes in other body tissues, it may also work for detecting changes in the cervix.

Working with a maternity hospital in Paris, the researchers did SWE measurements of 157 [pregnant women](#) who were already scheduled for ultrasounds. The researchers then followed each patient's pregnancy.

The researchers found that patients between 24 and 35 weeks pregnant who had below average cervical stiffness were at higher risk of going into [preterm labor](#).

In SWE, stiffness is measured based on how fast a mechanical shear wave propagates through the tissue. What the researchers found was that if the wave was more than one meter per second below the baseline for a woman's gestational age, or how far along she is in her pregnancy, the woman was more likely to have a [preterm birth](#).

"This work is only a first step," Muller says. "We know the technique is reproducible. We know we can measure these changes in cervical stiffness. However, we need to do a longitudinal study that follows

patients throughout pregnancy. That would give us a better understanding of how cervical stiffness changes over the course of pregnancy – and that would help us determine which changes are likely indicative of early onset labor."

Muller also notes that, while the SWE technique uses high-end ultrasound equipment, the equipment can be used for normal prenatal examinations as well as SWE assessments of cervical stiffness, which would hopefully mitigate any additional cost.

The paper, "Assessment of the Cervix in Pregnant Women Using Shear Wave Elastography: A Feasibility Study," is published in the journal *Ultrasound in Medicine and Biology*.

More information: "Assessment of the Cervix in Pregnant Women Using Shear Wave Elastography: A Feasibility Study." DOI: [dx.doi.org/10.1016/j.ultrasmedbio.2015.06.020](https://doi.org/10.1016/j.ultrasmedbio.2015.06.020)

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