

Pregnancy is a State of Balance Between Two Opposing Interactive Forces, Mechanisms, and Systems: A Hypothesis

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Abstract

- The mechanisms responsible for maintaining pregnancy and initiating parturition have not been fully elucidated in any species.
- Failures in understanding uterine functions during pregnancy are a major shortcoming of modern healthcare.
- This study investigated the current evidence-based literature and research that may support our proposed hypothesis.
- A 40-second 3D animation was developed in conjunction with a Houston-based medical company to support this hypothesis.
- <https://www.youtube.com/watch?v=dyYG-Jhxr7o&t=144s>
- The isthmus of the cervix, its anatomical and functional existence, rationale, and consequences should be reconsidered.
- There has been no convincing evidence to support its existence since Aschoff first proposed it in 1905.
- Uterine mechanotransduction has functional and molecular components.
- The exponential uterine wall tension (EUWT) is the functional component and intrinsic myometrial cell character (IMCC) is the molecular component.
- EUWT is created and maintained by a complex interaction among the gestational sac, uterus, and cervix, for which the primary function is to maintain the EUWT.
- IMCC enables the uterus to control its functions both autonomically and intrinsically, secondary to changes in tension, where high tension induces relaxation and low tension induces contraction.
- Pregnancy is a state of balance between two opposing interactive forces, mechanisms, and systems secondary to EUWT and progesterone/estrogen stimulation.
- EUWT induces the inhibitory system, which is the main system that maintains pregnancy through a stretch-dependent mechanism, in addition to direct myometrial relaxants.
- EUWT and progesterone/estrogen stimulation induce the stimulatory system by inducing myometrial hyperplasia and hypertrophy.
- Contractions of the stimulatory system create direct and indirect uterine-cervical interaction (DIDUCI).
- Direct uterine-cervical interaction pulls the cervix up while fixing it to the pelvic bone (through uterine and sacral ligaments) to push the fetus through the cervix and create indirect uterine-cervical interaction.
- DIDUCI makes the cervical valve, which maintains the EUWT, lose its strength and transform into a birth canal which is called the lower uterine segment (LUS).
- Transformation of the cervix into the LUS which has both radiological signs; i.e., the TYVU pattern formation, and the clinical signs.
- Progressive transformation of the cervix from the radiological T pattern into the YVU pattern formation takes place during the third trimester and appears clinically as; progressive cervical shortening, ripening, and effacement.
- There is evidence-based support for the hypothesis which might be the first step in uncovering the mystery of human parturition.