

Laplace Law Controls Pregnancy Intervals, Circadian Timers, and Mode of Delivery Through Exponential Uterine Wall Tension and Hormonal Milieu: A Hypothesis 2

Ali Hegazy¹

¹Portiuncula University Hospital

August 14, 2023

Abstract

Background Spontaneous preterm birth is the leading global cause of neonatal death, and countless efforts have failed to establish a single effective treatment for preterm labor, partly because the mechanisms that regulate the uterus and the cervix during pregnancy are not well understood. When a post-term pregnancy truly exists, its cause is mostly unknown. **Objective** To support the hypothesis. **Study Design:** This study investigated the current evidence-based literature and research that may support the hypothesis, accompanied by 40-second 3D animations. **Results** Light-dark cycle modulation of interactive inhibitory and stimulatory systems divides gestation into five clinical phases: growth, maturation, transition, parturition, and involution. During the maturation phase (30–40 weeks), nocturnal synchronisation and synergy of the inhibitory and stimulatory systems, secondary to light-dark cycle modulation, make the cervix progressively transform into the lower uterine segment and lose its strength, eventually causing EUWT failure. The clock that measures the duration of pregnancy consists of two interacting timers, an interval timer measuring the overall length of gestation and a circadian timer that defines when a 24-hour cycle birth occurs. Pregnancy intervals and circadian timers are achieved by a single mechanism, namely EUWT failure, secondary to the complete loss of cervical strength nocturnally. Inhibitory system malfunction causes preterm labor, and most of the current therapeutic modalities for preterm labor focus on delaying or preventing EUWT failure. Stimulatory system malfunctions cause post-term pregnancy. **Conclusion** The creation, autonomic maintenance, and eventually autonomic EUWT termination make pregnancy an autonomic cycle with constant intervals and circadian timers where its malfunctions change the timing of birth and pregnancy duration. Laplace's law measures EUWT, which might be the law of physics that controls pregnancy duration.

Hosted file

BJOG-SP2.docx available at <https://authorea.com/users/506021/articles/659968-laplace-law-controls-pregnancy-intervals-circadian-timers-and-mode-of-delivery-through-exponential-uterine-wall-tension-and-hormonal-milieu-a-hypothesis-2>



