Congress on Numerical Methods in Engineering 2022
12-14 Septiembre 2022, Las Palmas de Gran Canaria, España

Biomechanics of Childbirth

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ABSTRACT

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Pregnancy and childbirth are very complex processes, and sometimes with harmful consequences for the woman and/or the newborn. During pregnancy, the pelvic floor function (sphincteric - regulating storage and evacuation of urine and stool; support and stability of the pelvic organs, and sexual) may be compromised due to the effect of hormonal changes and increased intra-abdominal pressure. In vaginal delivery, the deformations to which the pelvic floor muscles are subjected, can lead to muscle damage which in turn lead to pelvic floor disorders. Vaginal delivery is the utmost epidemiological risk factor for the development of pelvic floor dysfunction. Increased incidence of pelvic floor disorders later in life is associated with damage to connective tissue or intolerable degree of muscle stretch. Labor is defined as regular uterine contractions that lead to progressive effacement and dilation of the cervix, resulting in uterus expulsion through the vagina of the products of conception.

Computational models have become an interesting alternative to elucidate the labor mechanisms, allowing to evaluate the influence of individual features. Computational simulations of childbirth aim to illustrate the whole progression of labor, and to act as an adjuvant tool in the clinical setting for specific cases that may result in complicated labor, predicted by the computational model.

This talk shows the importance of using computational models to predict, in a quantitative way, the effects of childbirth under a set of conditions.