

Reproductive Soft Tissues Biomechanics

Scientific area: Computational Applied Mathematics

Women's health research has greatly expanded in scope from a primary focus on reproductive health to a multifaceted and multidisciplinary research, though woman-specific clinical areas, such as obstetrics and urogynaecology still lead the majority of the resources, including public health concerns. Female pelvic floor dysfunction (PFDs) often result from weakening or damage of the soft tissue support structures, including pelvic floor muscles (PFM) or connective tissue. These dysfunctions, namely the urinary incontinence (UI) and pelvic organ prolapse (POP), are related to the weakness or direct injuries of the PFM associated with different risk factors - aging, hormonal changes or vaginal delivery.

Pregnancy and Vaginal delivery are the most relevant risk factors for PFD and some women show clinical or imaging proof of disrupted support to the pelvic organs namely due to injury or stretching to the pelvic floor structures. Also, number of vaginal deliveries has an impact on the later occurrence of PFDs. Despite intensive clinical research efforts, improving rehabilitation, reducing complications, reducing surgeries and complications arising after is slow. Consequently, the development of innovative tools to increase the biomechanical knowledge associated with these conditions may be crucial for effective and viable therapeutic procedures.

Computational Biomechanics is one of the most common approaches to model the biomechanical behaviour of the soft tissues, namely the numerical simulation applied to living organs. For modelling purposes, it is crucial to consider multidisciplinary research that may combine image processing and analysis, optimization algorithms, geometric modelling, constitutive material laws and experimental methodologies. For high-level Computational Biomechanics-based tasks are successful, new approaches have to be continually developed and improved, and expert users must evaluate their outputs.

The main goal of the proposed symposium is to attract scientists from a variety of scientific areas, across a broader field of topics and from more diverse geographical locations. Participants in this symposium should present and discuss their proposed methods in the corresponding fields bringing state of the art and future developments and evaluation in biomechanics of soft tissues.

This symposium should be an excellent opportunity to refine their ideas for future work and establish possible cooperation. The session's topics are related to computational biomechanics of the soft tissues, including:

- Numerical methods applied to soft tissues (FE and Meshless methods);
- Modelling of biological soft tissues;
- Image processing and analysis applied to soft tissues;
- Experimental testing and constitutive models for soft tissue structures;
- Multi-scale modelling of soft tissues.

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