

Mechanical Properties of Vagina - Endopelvic Fascia: First Study

Hynek Heřman^{1,2}, František Lopot¹, Karel Jelen¹, Michal Otčenášek²

¹Charles University, Faculty of Physical Education and Sport,
Dept. of anatomy and biomechanics, Laboratory of Biomechanics of Extreme Loading
phone: +420 603 526 656 e-mails: jelen@ftvs.cuni.cz, flopot@seznam.cz

²Institute For The Care Of Mother And Child, Prague

BACKGROUND This text will inform about first phase of our work focused on finding a possible simple detection method of elementary mechanical characteristics of vagina - endopelvic fascia complex compared to mechanical properties of used implants (1,2). At this phase, we have found a suitable method to describe mechanical properties of vagina - endopelvic fascia complex.

METHOD For data processing and evaluation, we used a linear-elastic model, formed by parallel connection of basic mechanical elements – springs – that represented endopelvic fascia and vaginal wall (Figure 1). Samples were obtained during necessary therapeutic solution of given diagnosis and were fixed on a cork plate immediately after being taken. They were then immersed into a physiological solution and stored at temperatures between 4 - 7 °C. Before the measurement, samples were standardised to cuboid shape. Measurements were computed in the shortest possible time after the samples had been taken (6 – 48 hours). To this date, we have evaluated data from 11 measurements. The experiment was performed according to the following protocol:

- load type: simple tension, load direction: caudal-cranial, loading speed: 20 mm /min
- the samples were not moistened during the test

RESULTS

1. Vaginal wall endures lesser prolongation compared to endopelvic fascia. This conclusion is valid for all our experiments performed so far, independent of patient anamnesis.

2. Sample rigidity increases with deformation and after reaching the maximum, it decreases while heading for rupture. This course has a concave characteristic and is visible on all tested samples.

3. After vaginal wall rupture, the rigidity of endopelvic fascia decreases with increasing deformation. This decrease can be considered linear with satisfying precision.

CONCLUSIONS Present results show quite high interindividual variability of mechanical properties of the vaginal wall – endopelvic fascia complex. It appears that mechanical properties of examined tissue complex change with number of pregnancies, are affected by diseases and physical load as well as presence of other factors, e.g. obesity. The study is still going on and these questions as well as comparison with properties of used implants are topics for our following work.

REFERENCES

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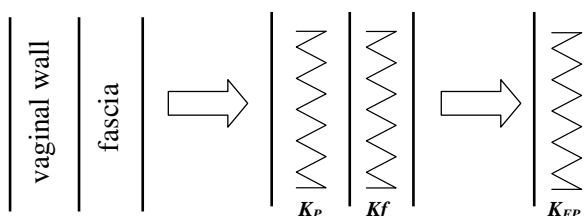


Figure 1: Biomechanical model:
vaginal wall + fascia