FORCE SPECTROSCOPY IN STUDY OF ENDOMETRIAL DISEASES

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BACKGROUND

The endometrium is the tissue lining the uterus cavity. The most important role of this tissue is enabling the embryo to implant and providing it with good conditions for growth and development.
According to many literature reports, cell and tissue mechanical properties have a significant role in many disease states. Changes in cell properties such as elasticity are observed in the case of various cancers or blood diseases.
The main technique for cell and tissue mechanical properties analysis is Force Spectroscopy. The force curves obtained during indentation reflect the interaction between the surface of the sample surface and the measuring probe. The course of these curves allows the determination of such properties as adhesion and Young modulus.
In this poster, we present results of research aimed at checking the relationship between Young's modulus of endometrial tissue and women's receptivity.

ENDOMETRIAL TISSUE

Implantation of embryo- the main function of the endometrium

Epithelium – an external layer of endometrial tissue, playing a dominant role in blastocyst adhesion

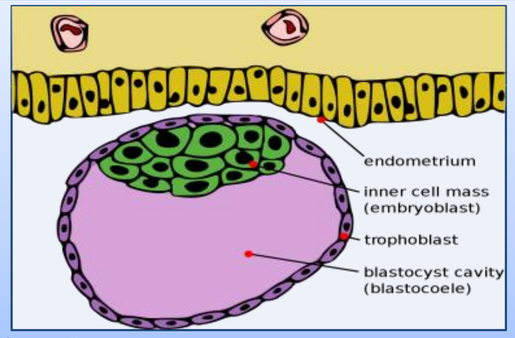

Fig. 1. Embryo implantation.
Surce: https://en.wikipedia.org/wiki/Inner_cell_massantation

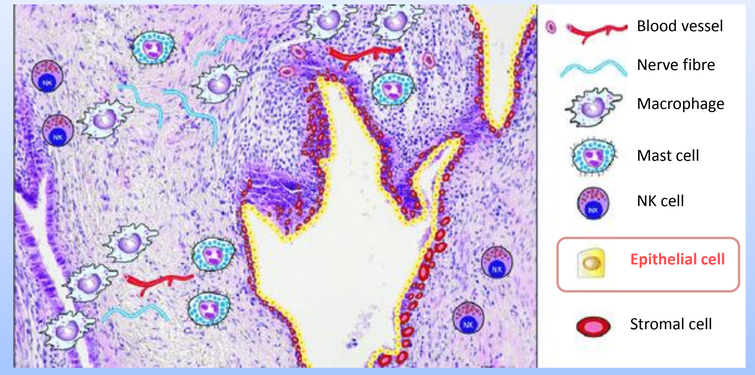

Fig. 2. Endometrium structure.
Surce: doi: 10.1111/aogs.13119

Embryo implantation critical features of endometrial tissue:
-Morphological features
-**Mechanical properties-** area of our interest

RESULTS

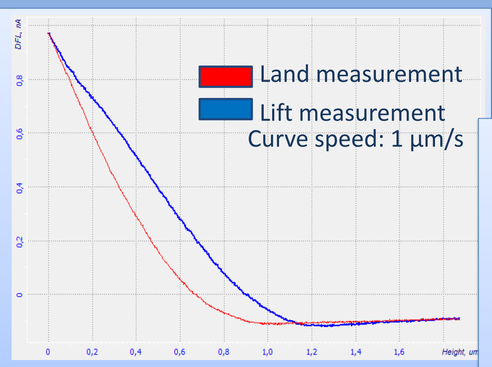

Fig. 3. A characteristic force-distance curve for tissue in HBSS.

The example of a force-distance curve. Such a course of F-D curves is characteristic for soft material.

Values of Young's modulus have a long-tailed distribution.

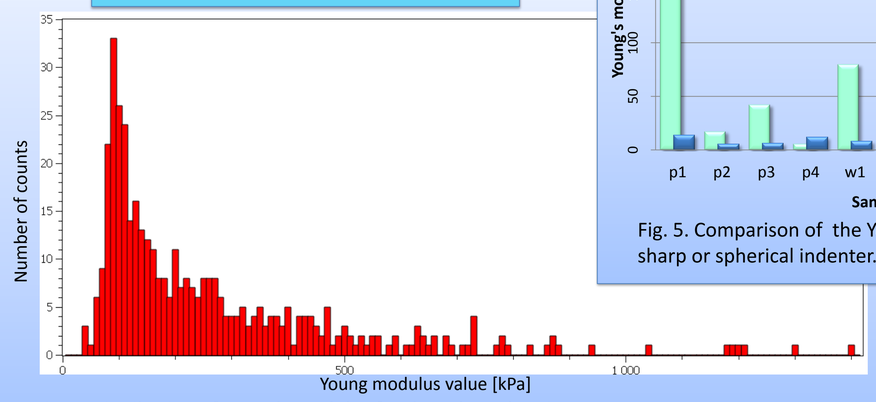

Fig. 4. Distribution of Young's modulus for the selected patient.

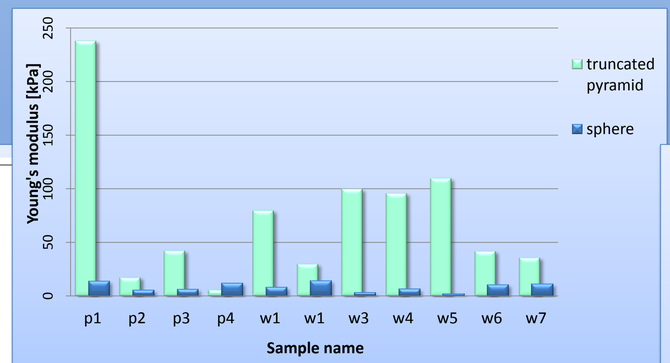

Fig. 5. Comparison of the Young's modulus value measured using sharp or spherical indenter.

Values of Young's modulus measured using sharp indenter is higher than in spherical indenter measurements.

The ratio of endometrium tissue Young's modulus value from sharp indenter to spherical indenter measurements is lower for a tissue with a polyp in comparison to tissue with other lesions (e.g. myoma).

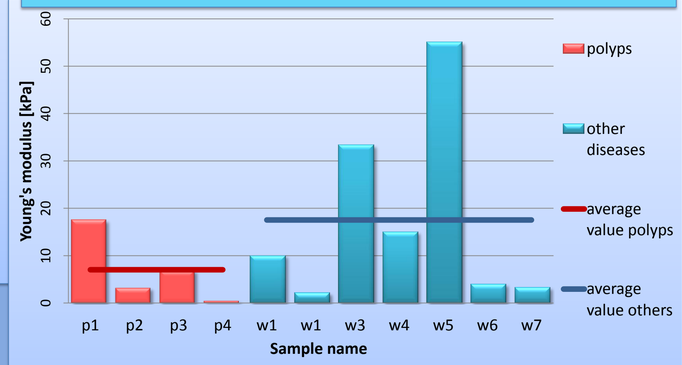

Fig. 6. The ratio of Young's modulus (E) value of endometrium tissue measured using sharp to value measured using spherical indenter. Comparison of E value of tissue with a polyp and other diseases .

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