New Biomechanical Approach Characterizes Vaginal Conditions

By Heather van Raalte, M.D.

As more and more radiofrequency (RF), laser treatment technologies, plastic, aesthetic or cosmetic procedures are used for vaginal modification, clinicians have come to understand the importance of objective anatomical/biomechanical and functional measures for vaginal characterization. Subsequently, reliable tools and techniques are required to objectively assess vaginal conditions before and after treatments. Notably, biomechanical and functional evaluations of vaginal conditions not only facilitate outcome assessment, but also a tailored course of action, leading to improved patient satisfaction.

Intended for use by physicians, surgeons and medically trained personnel, the Vaginal Tactile Imager (VTI) from Advanced Tactile Imaging (Trenton, N.J.), is a novel device that allows acquisition of the pressure patterns along the entire vagina to visualize tissue elasticity, muscle tone and strength at contraction. Comprising a vaginal probe equipped with 96 pressure (tactile) sensors positioned every 2.5 mm along both sides of the probe, an orientation sensor, and temperature sensors with micro-heaters, VTI software provides visualization, analysis, information and reporting tools. During a patient examination, data collected from the probe sensors are displayed on the VTI computer display in real time.

The VTI probe allows compression of vaginal tissues in the orthogonal direction to the tissue surface during probe insertion (Figure 1); pelvic floor tissue displacement during the probe elevation (Figure 2); vaginal wall deformation and pressure pattern acquisition during the probe rotation (Figure 3); and acquisition of pressure patterns for pelvic muscle contraction along the entire vagina (Figure 4). Currently, the VTI Model 2S is FDA approved for characterization of vaginal conditions, and a new CPT Category III Code is pending for Biomechanical mapping, transvaginal, with report.

In a pilot clinical study of laser vaginal therapies, VTI measurements before and after treatment demonstrated the following: Vaginal tissue elasticity improved in 8 of 12 patients (50% to 1400%); pelvic floor support, as a measurement of elasticity of the underlying tissues surrounding the vagina at probe elevation, improved in 8 of 12 patients (75% to 480%), four patients had unchanged measurements; the pelvic floor muscle strength for voluntary muscle contractions increased in the majority of patients (seven) with increases ranging from 63% to 233%, involuntary contractions (cough) increased in 5 of 12 patients, ranging from 84% to 330%; and finally, vaginal and pelvic floor improvements of >50% were reported after a single laser procedure in six cases, after two treatments in four cases and after three applications in two cases. We concluded that vaginal laser treatment not only seems to hold promising results clinically in treating dyspareunia and dryness due to vaginal atrophy, but also seems to improve tissue elasticity, pelvic floor support and muscle strength upon assessment with tactile imaging. In addition to monitoring biomechanical transformation of tissues before and after laser treatment, the VTI may predict the effectiveness of therapy for individual patients.

Author's note:
Clinical results with the VTI have been reported in numerous peer-reviewed publications: http://www.tactile-imaging.com/publications.html.

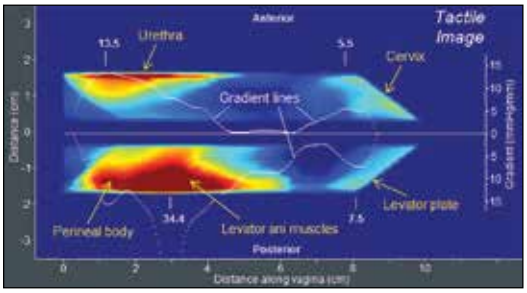

Figure 1: Vaginal tissue elasticity

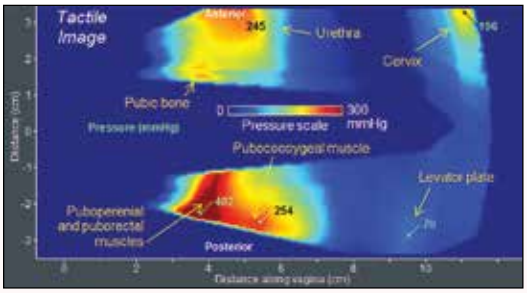

Figure 2: Pelvic floor support conditions

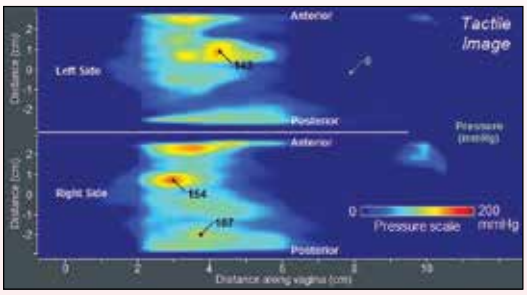

Figure 3: Condition of vaginal walls

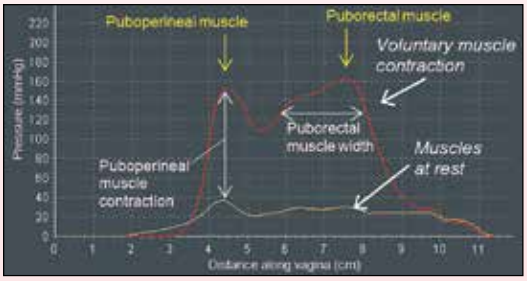

Figure 4: Pelvic muscle strength at contraction
Source: Advanced Tactile Imaging

Heather van Raalte, M.D.

Dr. van Raalte is chief medical director of Princeton Urogynecology and chairman of the Obstetrics & Gynecology Department, University Medical Center at Princeton (Princeton, N.J.). She is a board certified sub-specialist in female pelvic medicine and reconstructive surgery. Dr van Raalte is a pioneer in tactile imaging applications in urogynecology and laparoscopic surgery. Her clinical results with tactile imaging devices have been presented at 20+ scientific meetings and conferences. One of her recent publications is directly related to the clinical use of the Vaginal Tactile Imager: *van Raalte H, Egorov V. Characterizing female pelvic floor conditions by tactile imaging. International Urogynecology Journal 2015; 26(4): 607-609.*