

## Effect of Midurethral Sling Surgery on Vaginal Sensation

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### ABSTRACT

**Introduction:** Previous studies have reported changes in the sensory functioning of the vagina in women with pelvic floor disorder.

**Aim:** To evaluate vaginal and clitoral sensation before and after surgery with trans-obturator tape (TVT-O, Ethicon Johnson & Johnson).

**Methods:** Quantitative sensory thresholds for warm, cold, and vibratory sensations were measured at the vagina and clitoris 1 day before and 12 ± 4 months after surgery.

**Main Outcome Measures:** Differences in thresholds to warm, cold, and vibratory sensations at a pre-determined anatomic area of the genital region.

**Results:** Twenty-two women were admitted for midurethral sling surgery, and four were lost to follow-up. For the remaining 18 (mean age = 52 years, range = 37–65), we found a significant sensory decrease at the clitoral region to cold, warm, and vibratory stimuli after surgery. In contrast, in the anterior vaginal wall, there was a significant decrease only to warm stimuli after surgery.

**Conclusion:** TVT-O can cause sensory loss in the clitoral and anterior vaginal wall region that can be measured and quantified. The effect of such sensory loss on sexual function and quality of sexual life needs further investigation.

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**Key Words:** Stress Urinary Incontinence; Sexual Dysfunction; Genital Sensation; TVT-O

### INTRODUCTION

Urinary incontinence is a common and distressing problem in women. Varying rates of sexual dysfunction in incontinent women have been reported (range = 6%–64%).<sup>1</sup> Salonia et al<sup>2</sup> reported sexual dysfunction in 46% of patients with urinary incontinence; of them, 34% reported hypoactive sexual desire. A main concern of women with hypoactive sexual desire and urgency incontinence is leaking urine during intercourse. In that study, 23% of incontinent women reported sexual arousal disorder; 11% reported orgasmic deficiency, mainly owing to the fear of climacturia. Patients with urinary incontinence also had lower desire, poor lubrication, and sexual dissatisfaction compared with continent women.<sup>2</sup>

The midurethral sling is currently the gold standard treatment for the repair of female stress urinary incontinence. Although this is an effective treatment for decreasing incontinence symptoms and, hence, supposedly improves sexual function, the procedure is not without complications. The introduction of the midurethral sling to the genital region can interfere with arousal and sensory stimulation owing to greater nerve-ending density in the anterior wall.<sup>3</sup> A recent meta-analysis reported worsening of orgasm frequency and intensity in approximately 6% of women who underwent midurethral sling procedures.<sup>4</sup>

The present study evaluated sensory changes in the vaginal and clitoral regions after the use of TVT-O (Ethicon, Johnson & Johnson, Somerville, NJ, USA) for the repair of female stress urinary incontinence.

### MATERIALS AND METHODS

After approval from the institutional review board, all women who were referred to midurethral sling operation for the repair of female stress urinary incontinence were invited to participate in the study. We excluded women with mixed urinary incontinence predominated by urgency incontinence, previous gynecologic or pelvic surgery, diabetes, any neurologic disorder, or a Pelvic

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Organ Prolapse stage of at least II. An informed consent was obtained from all participants.

Before the operation, the participants completed two validated condition-specific questionnaires related to symptoms of urinary disorders and sexual function: (i) a urinary bother questionnaire, the short form of the Urinary Distress Inventory (UDI-6)<sup>5</sup>; and (ii) a sexual function questionnaire, the Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12).<sup>5</sup> We also collected data from each participant: (i) demographics (age, race, and marital or partner status); (ii) medical and surgical history including parity; (iii) menopausal and hormonal status; (iv) body mass index; and (v) Pelvic Organ Prolapse Quantification System staging. Each participant underwent quantitative sensory testing 1 day before the operation, always during a non-menstrual period, to measure baseline genital sensation at the anterior and posterior vaginal walls and at the clitoris. One year after surgery, the same quantitative sensory testing was repeated.

### Quantitative Sensory Tests

The quantitative sensory tests were performed with a thermal and vibration Genito-Sensory Analyzer (Medoc Ltd, Ramat Yishai, Israel) for the clitoral and vaginal area. The Genito-Sensory Analyzer is a computer-controlled diagnostic device for the evaluation of sensory impairment. The Genito-Sensory Analyzer generates and records stimuli that are used for sensory threshold measurement by repetitive transient temperature stimuli. Cold sensation thresholds are obtained for the sampling of small-caliber A- $\delta$  fibers, warm sensation thresholds for C-fibers, and vibratory sensation thresholds for large-caliber A- $\beta$  fibers. The thermal probe has a working range of 10°C to 50°C. The vibration frequency is fixed at 100 Hz, with an amplitude range of 0 to 130  $\mu$ m.

## MAIN OUTCOME MEASURES

### Psychophysical methodology

We used the method of limits for threshold determination of warm, cold, and vibratory sensations for the vagina and the clitoris.<sup>6</sup> According to this method, stimulus intensity was linearly increased until the subject indicated the initial perception of a sensation of temperature or vibration by pressing a button. The act of pressing the button also reset the probe back to adaptation temperature or no vibration. Adaptation temperature was 37°C, and the rate of temperature change was 1°C/s. The rate of vibratory amplitude increase was 1  $\mu$ m/s. Four successive stimuli were given in each of the three modalities. An SD of the mean of four thresholds above 0.5 was interpreted as non-optimal performance, probably owing to distraction, and was an indication for repeating the stimulatory test.

### Statistical Analysis

SPSS 19.0 for Windows (SPSS, Inc, Chicago, IL, USA) was used for data management and statistical analysis. Histogram

**Table 1.** Comparison of Sensory Thresholds Before and After TVT-O\*

Sensory modality	Anatomic site	Before TVT-O	After TVT-O	<i>P</i> value
Warm (°C)	Anterior vagina	41.1 ± 1.1	42.2 ± 1.8	0.006
	Posterior vagina	40.4 ± 1.3	41.2 ± 1.7	<0.054
	Clitoris	39.3 ± 1.3	40.9 ± 2	0.005
Cold (°C)	Anterior vagina	30 ± 2.3	29 ± 2.6	0.059
	Posterior vagina	31.2 ± 1.9	30.8 ± 3	0.42
	Clitoris	33.5 ± 1.1	32.1 ± 2.7	0.01
Vibration (Hz)	Vagina	4.5 ± 1.3	5.7 ± 3.8	0.19
	Clitoris	2.7 ± 1.1	4.3 ± 2.2	0.004

\*Data are described by sensory modality and anatomic site combination. Thresholds are presented as mean ± SD.

curves were used to evaluate homogeneity distribution of the data. Student paired t-test was used to compare sensory thresholds before and after surgery. Pearson correlations were obtained to examine relations between independent continuous variables. A 0.05 significance level was used for all statistical tests. No one-sided tests were performed.

### Power Analysis

Based on a previous study,<sup>7</sup> we estimated that to achieve a difference of 1°C before and after surgery in the sensation of the anterior vaginal wall, 16 subjects were required to have 80% power using a Student paired t-test with a 0.05  $\alpha$  level.

## RESULTS

Of 22 patients recruited, 18 (81%) returned for a second visit at a mean time of 12 ± 4 months after surgery; their mean age was 52 years (range = 37–65). Three patients were not reached by phone and one declined to come for a second visit because of her busy schedule. The latter was satisfied with the results of surgery. Fifteen (83%) were sexually active. PISQ and UDI-6 scores showed significant improvement in sexual function and urinary symptoms after surgery (38.5 ± 5.1 vs 31.5 ± 8.6 and 3.8 ± 4 vs 2.9 ± 4.5, respectively  $P < .04$ ).

After surgery, sensation to temperature (warm and cold) and vibratory stimuli was decreased at the clitoral area (Table 1). A decrease in sensation to warm stimuli was the only significant change at the anterior vaginal wall. In the clitoris, there was a moderate to high correlation between decreases in thresholds to the different stimuli modalities: between warm and vibratory stimuli ( $\rho = 0.66$ ), between cold and vibratory stimuli ( $\rho = -0.51$ ), and between cold and warm stimuli ( $\rho = -0.48$ ,  $P < .04$ ).

There were no significant correlations between changes in sexual function and changes in sensation at any of the genital regions ( $P > .05$ ), and there were no correlations between time from surgery to genital sensation and sexual function ( $P > .05$ ).

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