



# Er-Yag laser treatment implications in female sexual dysfunction

---

DAVID LUKANOVIĆ, MD

BARCELONA, 27TH APRIL 2019

---

**NO DISCLOSURE**

---

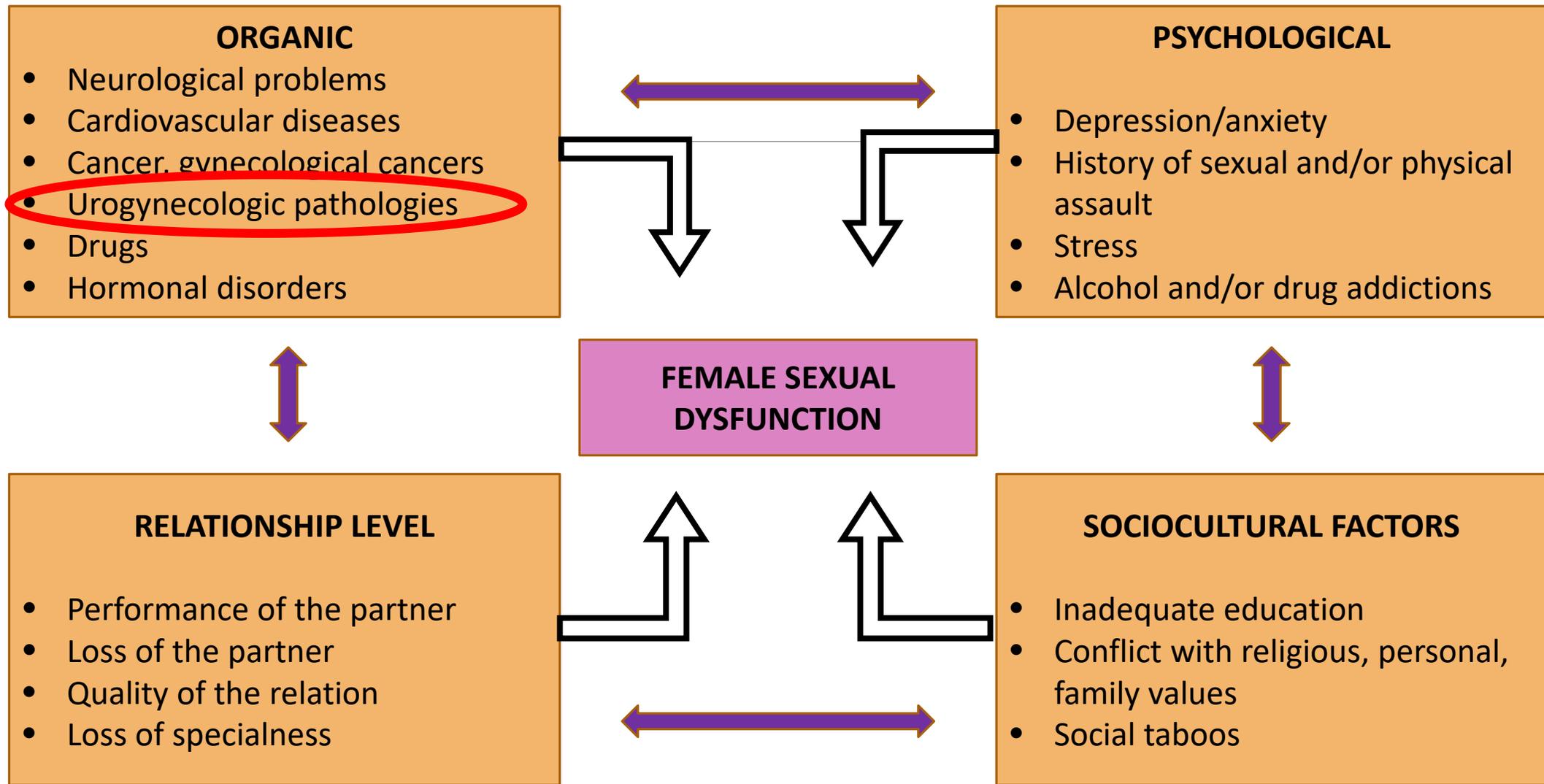
**“THE QUALITY OF LIFE IS MORE IMPORTANT  
THAN LIFE ITSELF.”**

**ALEXIS CARREL**

***Alexis Carrel (1873-1944):*** was a French surgeon and biologist who was awarded the Nobel Prize in Physiology or Medicine in 1912 for pioneering vascular suturing techniques.

# PELVIC FLOOR DYSFUNCTION AND QUALITY OF LIFE

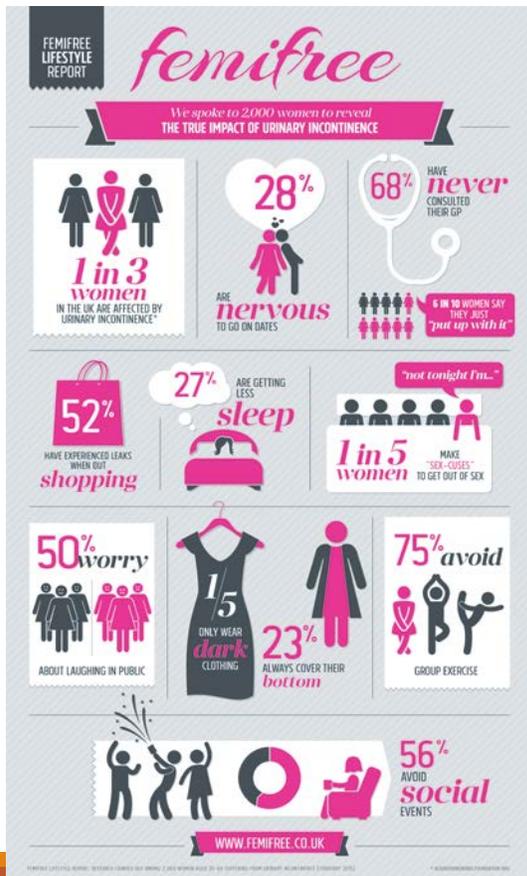




# PELVIC FLOOR DYSFUNCTION

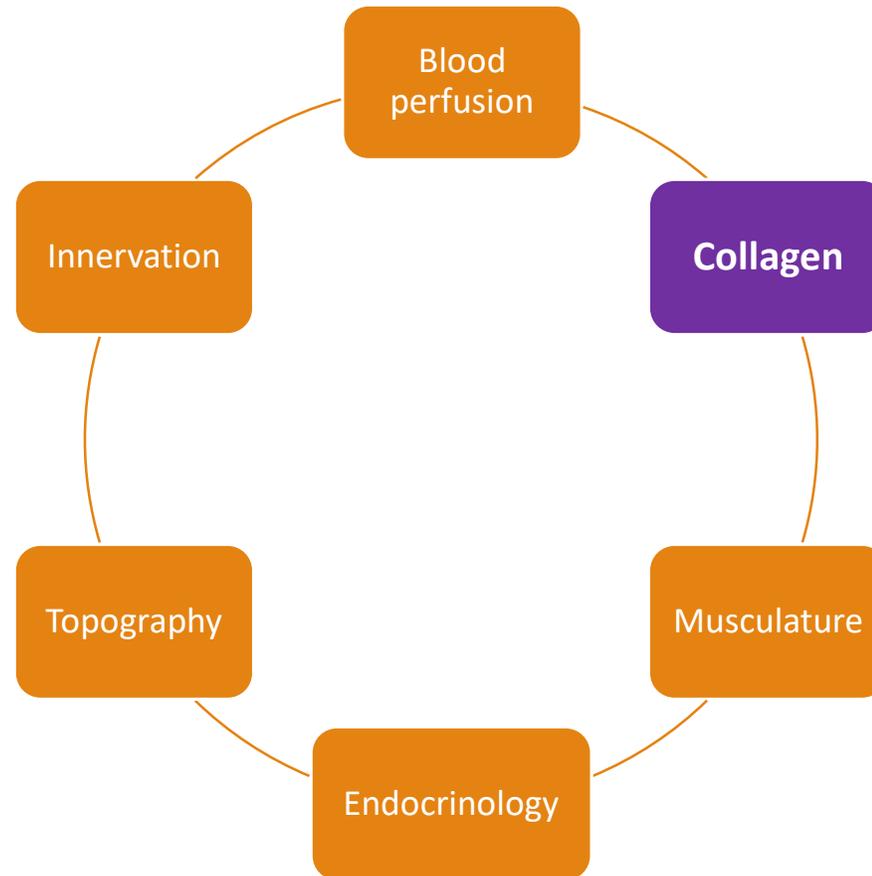
## Involuntary urine leakage

## Loss of sexual gratification

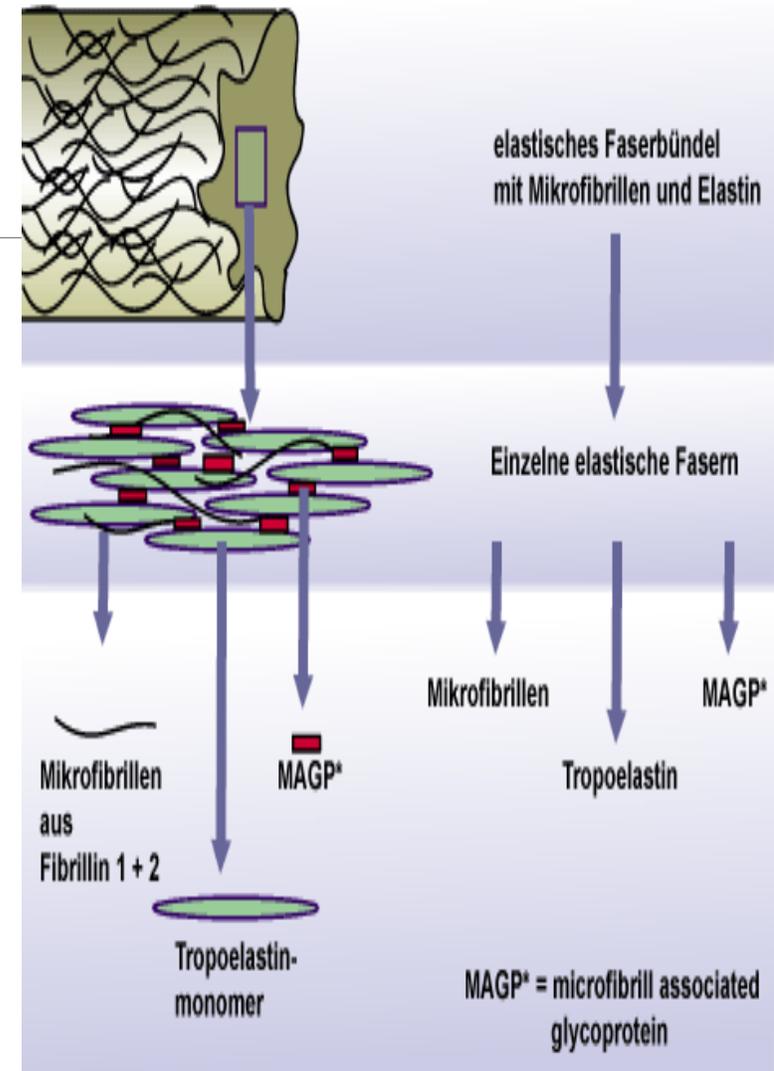


# PELVIC FLOOR FUNCTION IS A MULTIFACTORIAL COMPLEX SITUATION

---



- Collagen is a specific glycoprotein synthesized in the fibroblasts
- Elasticity of all structures in human being is due to collagen and elastin
- 80% of them are proteins
- Collagenesis is diminishing through ageing process of any human being



# LASER TYPES AND APPLICATIONS

---

Medical lasers are divided into four groups:

- gas lasers (CO<sub>2</sub>, Argon, HeNe)
- liquid lasers
- diode lasers
- solid state crystal lasers (Er:YAG, Nd:YAG)

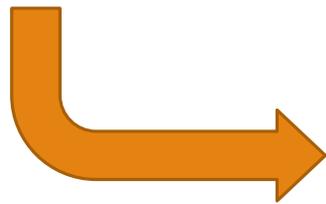
Laser Type	Wavelength (nm)	Active Medium	Absorbing Chromophores	Applications
<b>Er:YAG</b>	2940	Erbium in yttrium-aluminum-garnet crystal (Er:YAG)	Strongly absorbed by water	photo-rejuvenation, skin resurfacing, removal of benign lesions, soft and hard tissue surgery
<b>Nd:YAG</b>	1064	Neodymium in yttrium-aluminum-garnet crystal (Nd:YAG)	Homogeneous absorption in melanin and hemoglobin.	hair removal, blood vessel treatment, tattoo removal, photo-rejuvenation, acne treatments, soft tissue surgery

# LASER = Light Amplification by Stimulated Emission of Radiation

---

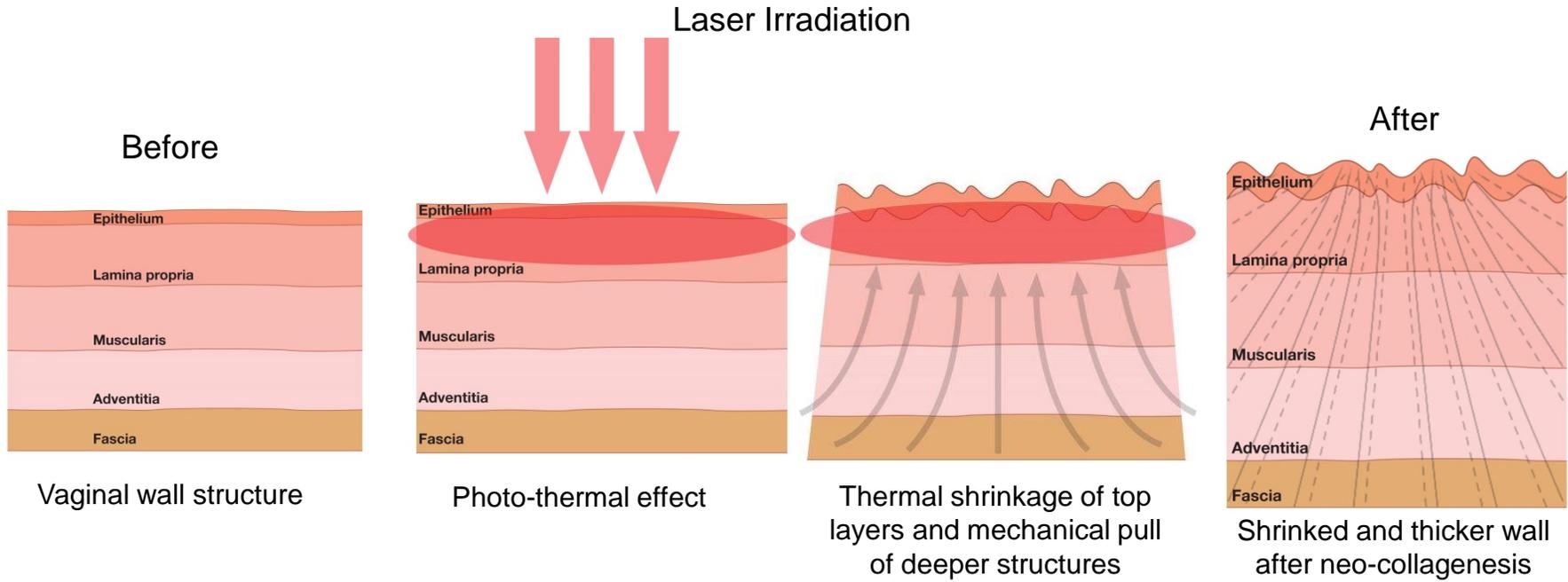
**Mechanism of action consists of three components:**

- 1. Photo-Thermal Interaction**
- 2. Thermo-Mechanical Interaction**
- 3. Growth of New Collagen Fibers**



As a result of the thermal effects, intermolecular cross-links that stabilize collagen triple-helix structure are broken, which leads to the shrinkage of collagen fibrils and improvement in tissue firmness.

# Mechanism of action



Courtesy of Juna Clinic



M. Rivera measured an average shrinking of vaginal canal of 12 mm (or 17%)

A.A. Bezmenko measured an average thickening of vaginal wall of 1.5 mm (or 56%)



Courtesy of Juna Clinic

## Er: YAG for Controlled Tissue Heating

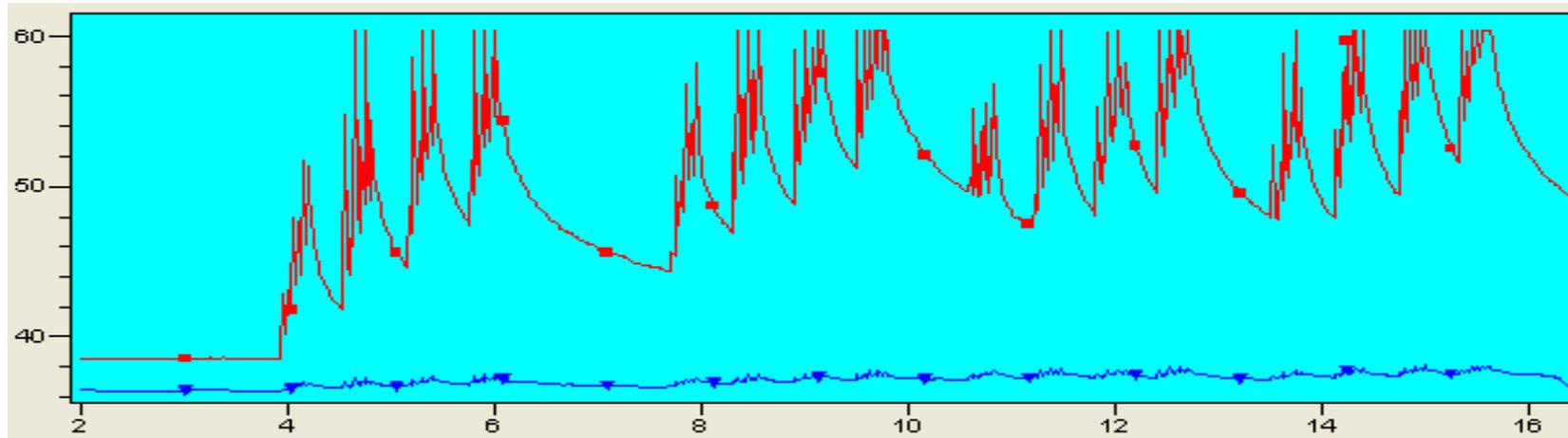
Photothermal effect of laser beam acts on mucous tissues provoking its shrinkage without removal of the tissue



Using the proper dosage of non-ablative ErYAG the temperature in mucosa reaches

**60°C to 63°C**

This is the optimal temperature for the process of shortening the collagen fibers and neocollagenesis [1]



- 1) Dams SD, de Liefde-van Beest M, Nuijs AM, Oomens CW, Baaijens FP : Pulsed heat shocks enhance procollagen type I and procollagen type III expression in human dermal fibroblasts, Skin Res Technol. 2010 Aug;16(3):354-64

## Laser treatment in gynecology

---

1. Laser treatment of Vaginal Relaxation Syndrome
2. Laser treatment of Stress Urinary Incontinence
3. Laser treatment of Vaginal Atrophy
4. Laser treatment of Pelvic Organ Prolapses
5. Laser treatment of Lichen Sclerosus
6. Laser aesthetic procedures

# LASER TREATMENT OF VAGINAL RELAXATION SYNDROME

ISSN 1855-9913

Journal of the Laser and Health Academy  
Vol. 2012, No.1; www.laserandhealth.com

## Laser Vaginal Tightening (LVT) – evaluation of a novel noninvasive laser treatment for vaginal relaxation syndrome

Jorge E. Gaviria P, Jose A. Lanz L  
*Aldana Laser Center, Caracas, Venezuela*

### ABSTRACT

The objective of this study was to evaluate the safety and efficacy of a novel laser treatment for vaginal relaxation syndrome.

**Method:** A pilot study was conducted on 21 patients who received the novel laser treatment (IntimaLase) for vaginal tightening with a 2940 nm Er:YAG laser between June 2011 and January 2012. All patients received two treatment sessions with an interval between sessions of 15 to 30 days. In a non-ablative, thermal-only mode, laser energies of approx. 90 J per treated area in the vaginal canal and of approx. 10 J per treated area at the vestibule and introitus were delivered to the patient's vaginal mucosa. A special Laser Vaginal Tightening (LVT) questionnaire was

**Key words:** vaginal relaxation syndrome, laser treatment, Er:YAG laser, collagen remodeling and synthesis

*Article: J. LAHLA, Vol. 2012, No.1; pp. 32-39.*

*Received: April 13, 2012; Accepted: May 04, 2012.*

© Laser and Health Academy. All rights reserved.

Printed in Europe. [www.laserandhealth.com](http://www.laserandhealth.com)

### I. INTRODUCTION

Vaginal Relaxation Syndrome (VRS) is a quite common medical condition described as a loss of the optimal vaginal structure and is usually associated with vaginal child delivery and natural aging. Multiple

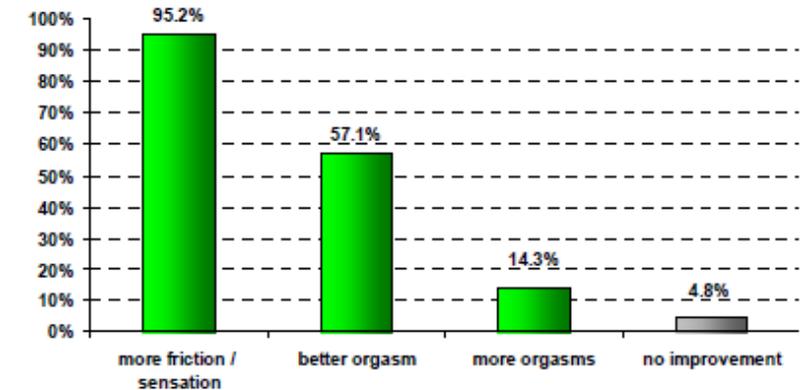
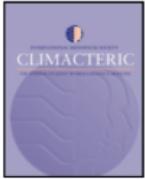


Fig. 18: Patients' assessment of sexual gratification improvement after IntimaLase™ treatment.



### Vaginal erbium laser: the second-generation thermotherapy for the genitourinary syndrome of menopause

M. Gambacciani, M. Levancini & M. Cervigni

To cite this article: M. Gambacciani, M. Levancini & M. Cervigni (2015) Vaginal erbium laser: the second-generation thermotherapy for the genitourinary syndrome of menopause, *Climacteric*, 18:5, 757-763, DOI: [10.3109/13697137.2015.1045485](https://doi.org/10.3109/13697137.2015.1045485)

To link to this article: <http://dx.doi.org/10.3109/13697137.2015.1045485>

© 2015 International Menopause Society

Published online: 15 Sep 2015.

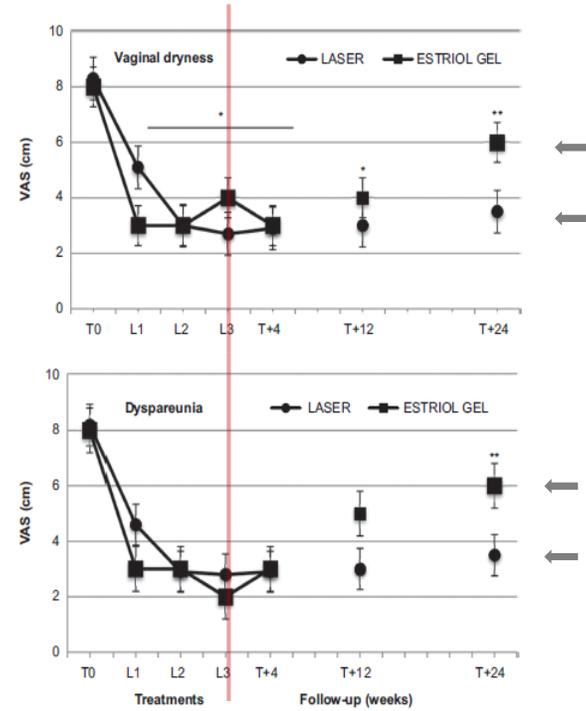


Figure 1 Effect of second-generation laser thermotherapy on vaginal dryness (upper panel) and dyspareunia (lower panel) using the visual analog score (VAS) on a 10-point scale for the women receiving laser treatment (n = 43) and the women receiving estriol (n = 19). See text for details. \*, p < 0.01 vs. corresponding basal values in both groups; \*\*, p < 0.05 vs. estriol basal values and corresponding laser group values

### CONCLUSION:

This pilot study demonstrates that vaginal erbium laser induces a significant improvement of GSM, including vaginal dryness, dyspareunia and mild to moderate SUI. Further studies are needed to explore the role of laser treatments in the management of GSM.



## Treatment of female stress urinary incontinence with Erbium-YAG laser in non-ablative mode

Jack I. Pardo<sup>a,\*</sup>, Vicente R. Solà<sup>b</sup>, Andrea A. Morales<sup>c</sup>

<sup>a</sup>Clínica Sara Moncada, Santiago 7700668, Chile

<sup>b</sup>Clínica Las Lilas, Santiago, Chile

<sup>c</sup>Hospital Clínico Universidad de Chile, Santiago, Chile

- Laser treatment improved not only the impact of SUI symptoms on quality of life a but also sexual function
- 81.8% of sexually active women reported improvement of sexual gratification

### CONCLUSION:

Based on this short-term pilot study, non-ablative Er:YAG laser procedure seems to be a safe and efficacious alternative for patients with SUI. Further controlled studies will help to validate the use of non-ablative Er:YAG for treatment of SUI.



## Effects of laser procedure for female urodynamic stress incontinence on pad weight, urodynamics, and sexual function

Yi-Wen Tien<sup>1,2</sup> · Sheng-Mou Hsiao<sup>3</sup> · Chien-Nan Lee<sup>2</sup> · Ho-Hsiung Lin<sup>2</sup>

- Regarding LUTS, the majority of domains on the King's Health Questionnaire and female sexual desire and function exhibited significant improvements.

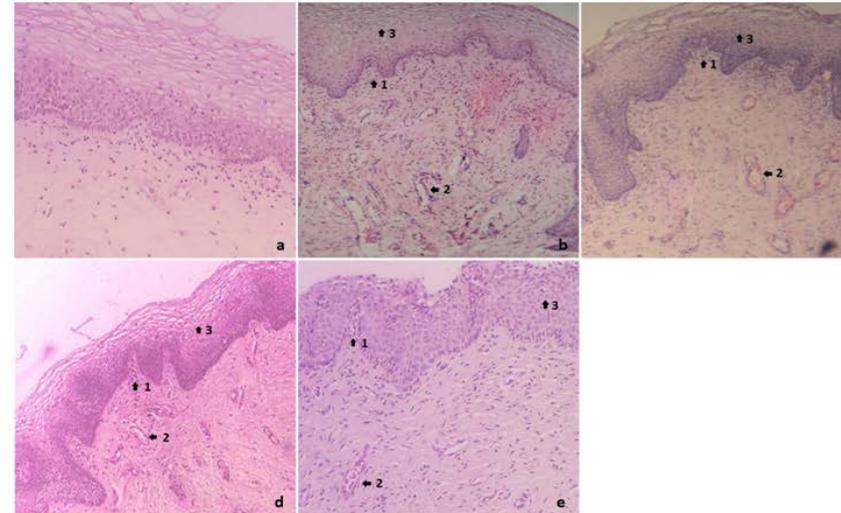
### CONCLUSION:

The effect of the IncontiLase™ procedure for mild USI was moderate at 6-month follow-up but was not effective for pad weight >10 g. Moreover, it improved LUTS, quality of life, QoL, and sexual function of both partners. Further studies should be performed to assess long-term sustained efficacy.

## Efficacy of Erbium:YAG Laser Treatment Compared to Topical Estriol Treatment for Symptoms of Genitourinary Syndrome of Menopause

Adrian Gaspar, MD,\* Hugo Brandi, PhD, MD, Valentin Gomez, MD, and Daniel Luque, MD  
Faculty of Medicine, Department of Gynecology, Mendoza University, Av. Boulogne Sur Mer 683, Mendoza, Argentina

- Significant improvement in maturation value and a decrease of pH in the laser group was detected up to 12 months after treatment.
- The improvement in all endpoints was more pronounced and longer lasting in the laser group.
- Histological examination showed changes in the tropism of the vaginal mucosa and also angiogenesis, congestion, and restructuring of the lamina propria in the laser group.



- 1 - increase in papillomatosis  
2 - vasodilation and congestion in the lamina propria  
3 - a more pronounced, stratified squamous epithelium with an increased glycogenic load.

### Changes in epithelial tissue

- Parakeratosis (keratinocyte growth)
- Acanthosis
- Increase of glucogenic store

### Changes in the Lamina Propria

- Marked angiogenesis, major congestion (red blood cells in the lumen of neo-vessels)
- Collagenesis
- Increase in the cellularity of the extracellular matrix (blasts of G0 to G1 phases)
- Papillomatosis

### CONCLUSION:

Our results show that Er:YAG laser treatment successfully relieves symptoms of genitourinary syndrome of menopause and that the results are more pronounced and longer lasting compared to topical estriol treatment.



Original Article

## Effect of non-ablative laser treatment on overactive bladder symptoms, urinary incontinence and sexual function in women with urodynamic stress incontinence

Yi-Hao Lin <sup>a, b</sup>, Wu-Chiao Hsieh <sup>a</sup>, Lulu Huang <sup>a</sup>, Ching-Chung Liang <sup>a, b</sup> ✉

- 82.7% sexually active patients and 54.2% of their sexual partners reported improved sexual gratification three months later.

### CONCLUSION:

Erbium:YAG laser treatment can resolve USI and coexistent OAB symptoms three months after therapy. Sexual experience is also improved. However, repeated laser therapy may be necessary after six months.



Original Article

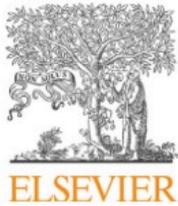
## The short-term outcome of laser in the management of female pelvic floor disorders: Focus on stress urine incontinence and sexual dysfunction

Hsin-Yin Lin <sup>a, b, c</sup>, Hsiao-Wen Tsai <sup>a, b, c</sup>, Kuan-Hao Tsui <sup>a, b, c, d, e</sup>, Ya-Fen An <sup>a, f</sup>, Ching-Chuan Lo <sup>a, f</sup>, Zi-Han Lin <sup>a, f</sup>, Wen-Shiung Liou <sup>a, b, c, g, 1</sup>, Peng-Hui Wang <sup>b, h, i, 2, 1</sup> ✉

- Sexual dysfunction was improved in 13 patients (44.83%), but Female Sexual Function Index (FSFI) scores were not different before and after laser treatment ( $44.22 \pm 23.36$  vs.  $44.09 \pm 24.51$ ,  $P = 0.389$ ).

### CONCLUSION:

Laser therapy either by Erbium:YAG laser or CO<sub>2</sub> laser seemed to be useful for female pelvic floor disorders, especially on improvement of SUI symptoms; however, the effectiveness needs further confirmation.



Contents lists available at ScienceDirect

## European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: [www.elsevier.com/locate/ejogrb](http://www.elsevier.com/locate/ejogrb)



Full length article

### Non-ablative Er:YAG laser therapy effect on stress urinary incontinence related to quality of life and sexual function: A randomized controlled trial



Mija Blaganje<sup>a</sup>, Darija Ščepanović<sup>a</sup>, Lidija Žgur<sup>a</sup>, Ivan Verdenik<sup>a</sup>, Franja Pajk<sup>b</sup>, Adolf Lukanović<sup>a,\*</sup>

<sup>a</sup> Department of Gynecology, University Medical Centre Ljubljana, Ljubljana, Slovenia

<sup>b</sup> LA&HA-Laser and Health Academy, Stegne 3, Ljubljana, Slovenia



## Conclusion

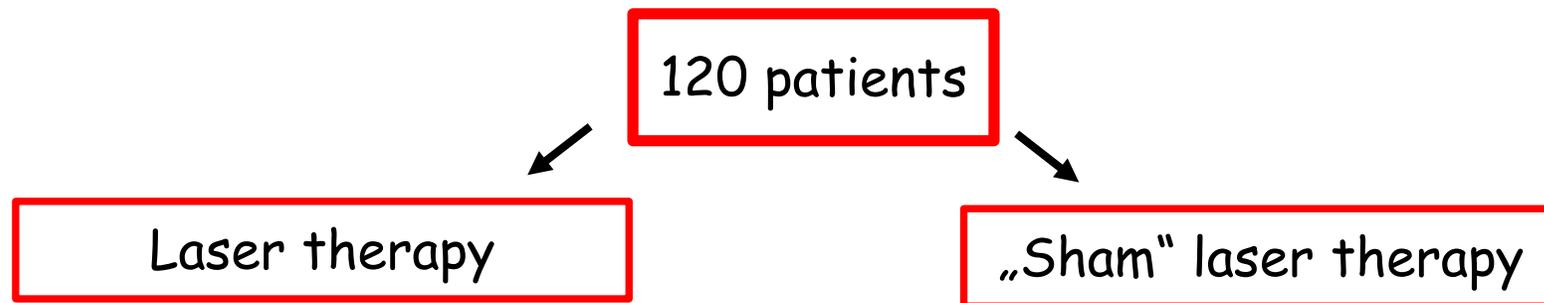
The non-ablative Er:YAG laser therapy improves the impact of SUI symptoms on quality of life and sexual function in premenopausal parous women significantly better than placebo. It provides a promising minimally-invasive safe treatment alternative for SUI.



---

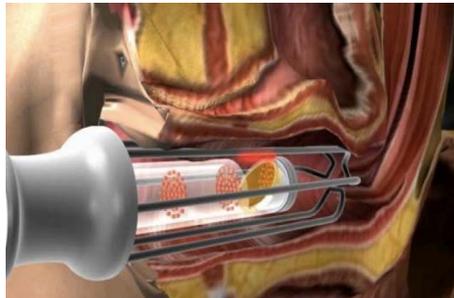
LASER THERMOTHERAPY IN PELVIC FLOOR DYSFUNCTION  
RANDOMISED PLACEBO CONTROLLED STUDY

**Randomisation**





## TREATMENT PROTOCOL Step 1

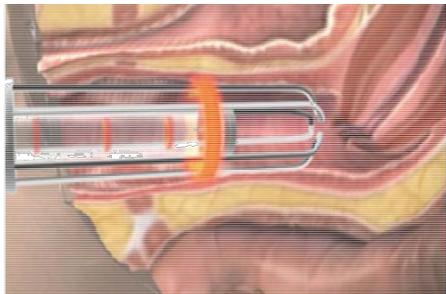
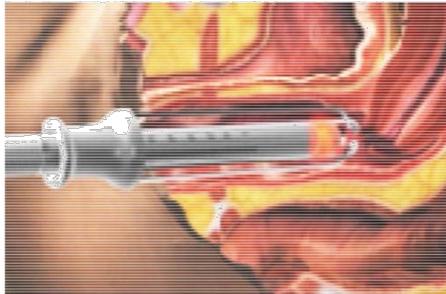


<b>User Interface Mode</b>	Er:YAG PULSE	
<b>Handpiece</b>	PS03 with GA adapter The engraved ring on the handpiece must be set to 7 mm spotsize.	
<b>Spot size</b> (as set on the system control panel)	7 mm GA *	
<b>Pulse width</b>	SMOOTH	
<b>Frequency</b>	1.6 Hz	
<b>G-set Speculum</b>	Standard	Slim
<b>Fluence</b>	6.0 J/ cm <sup>2</sup> *	5.0 J/ cm <sup>2</sup> *

Four laser pulses were deposited at every 5 mm along the total length of the vagina in five passes.



## TREATMENT PROTOCOL Step 2

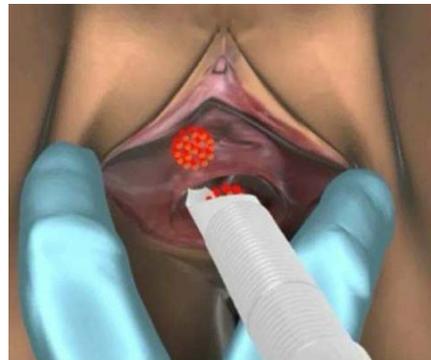
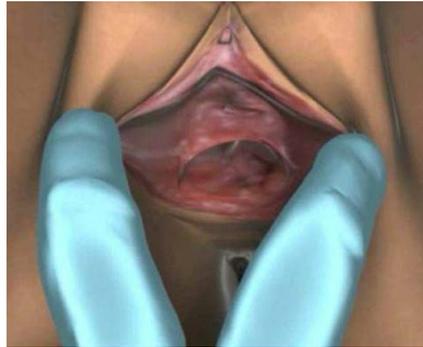


<b>User Interface Mode</b>	Er:YAG PULSE	
<b>Handpiece</b>	R11 with GC adapter The engraved ring on the handpiece must be set to 7 mm spotsize.	
<b>Spot size</b> (as set on the system control panel)	7 mm GC*	
<b>Pulse width</b>	SMOOTH	
<b>Frequency</b>	1.6 Hz	
<b>G-set Speculum</b>	Standard	Slim
<b>Fluence</b>	3.0 J/ cm <sup>2</sup> *	2.5 J/ cm <sup>2</sup> *

Circular adaptor was used to irradiate the whole vaginal canal in three passes

## TREATMENT PROTOCOL

### Step 3



<b>User Interface Mode</b>	Er:YAG PULSE
<b>Handpiece</b>	PS03 The engraved ring on the handpiece must be set to 7 mm spotsize.
<b>Spot size</b> (as set on the system control panel)	7 mm
<b>Pulse width</b>	SMOOTH
<b>Frequency</b>	1.6 Hz
<b>Fluence</b>	10 J/ cm <sup>2</sup>

The mucosa of the vestibule and the introitus were irradiated with PS03 with a straight adaptor

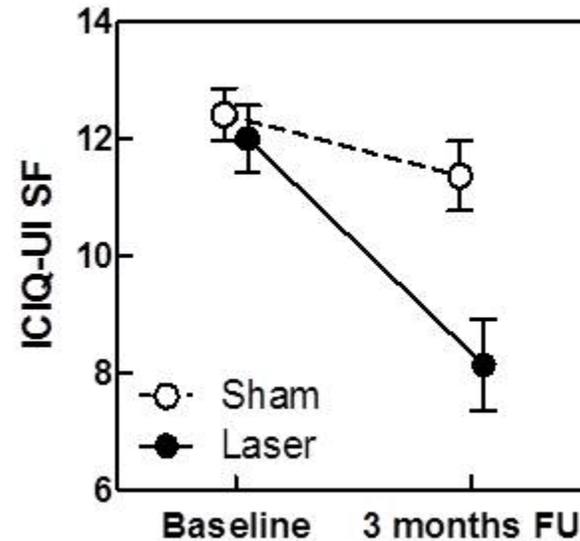


## Evaluation at inclusion and 3 months later

1. Questionnaire for self evaluation of severity of UI: **ICIQ-UI SF** (International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form).
2. Questionnaire for self evaluation of the impact of UI on sexual function: **PISQ-12** (Pelvic Organ prolapse/Urinary Incontinence Sexual Function Questionnaire).
3. Questionnaire for self evaluation of female sexual function: **FSFI** (Female Sexual Function Index).



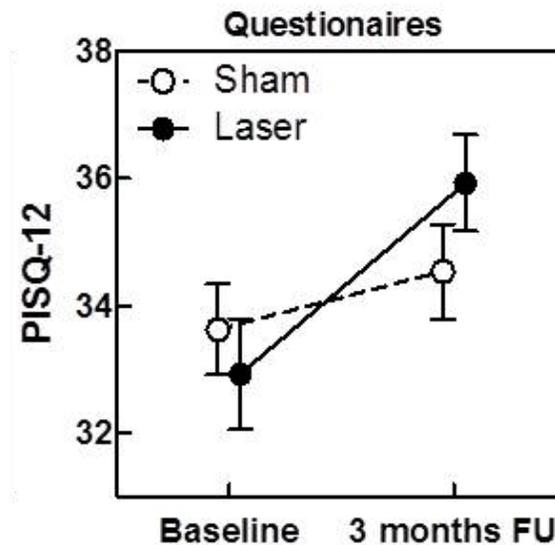
ICIQ-UI SF questionnaire result: average score at baseline and 3 months after therapy are presented for interventional laser and control group.



The improvement of SUI severity was significant in both groups, ICIQ-UI SF test showed statistically significant improvement ( $p < 0,001$ ) of laser group compared with improvement of control group



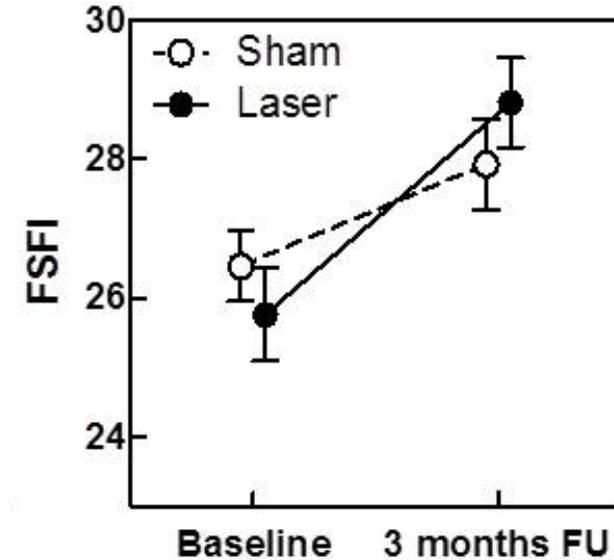
PISQ-12 questionnaire result: average score at baseline and 3 months after therapy are presented for interventional laser and control group.



Sexual improvement evaluated by PISQ-12 test. Statistically significant ( $p=0,009$ ) improvement of sexual function in laser group compared with control group.



Female Sexual Function Index: Questionnaire for self evaluation of female sexual function



*Statistically significant improvement in both groups ( $p < 0,001$ )  
Although the laser group had better improvement, the difference in improvement between two groups were not statistically significant ( $p = 0,512$ )*

*Higher value present better sexual function*



[International Urogynecology Journal](#)

October 2017, Volume 28, [Issue 10](#), pp 1445–1451 | [Cite as](#)

## A systematic review on vaginal laser therapy for treating stress urinary incontinence: Do we have enough evidence?

[Authors](#)

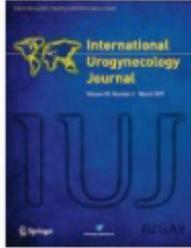
[Authors and affiliations](#)

Vasilios Pergialiotis , Anastasia Prodromidou, Despina N. Perrea, Stergios K. Doumouchtsis

### Conclusions

As the demand for minimally invasive approaches for treating SUI increases, it is expected that more patients will seek alternative treatments over current standards (midurethral slings).

Given the limitations of the existing studies, it seems that conducting future trials is necessary to elucidate this field.



[International Urogynecology Journal](#)

..... pp 1-1 | [Cite as](#)

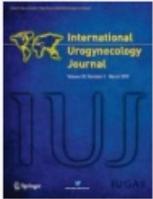
## Commentary on “The use of laser in urogynaecology”

Authors

[Authors and affiliations](#)

Adolf Lukanović 

Bhide et al. conclude that there is a lack of randomized placebo-controlled trials concerning the effect of vaginal laser treatment for SUI but they missed the first one published in May 2018. In this randomized controlled trial including 114 women with SUI the improvement in ICIQ-UI SF, PISQ-12 and FSFI scores 3 months after single treatment was significantly better in the vaginal erbium laser group than in the sham control group



International Urogynecology Journal

March 2019

IUGA  
treat  
syndr

Authors

S. Abbas Sh

on behalf of

J Obstet Gynaecol Can. 2019 Apr 11. pii: S1701-2163(19)30081-7. doi: 10.1016/j.jogc.2019.01.023. [Epub ahead of print]

### Efficacy of Non-ablative Laser Therapy for Lichen Sclerosus: A Randomized Controlled Trial.

Bizjak Ogrinc U<sup>1</sup>, Senčar S<sup>2</sup>, Luzar B<sup>3</sup>, Lukanović A<sup>4</sup>.

#### ⊕ Author information

#### Abstract

**OBJECTIVE:** The aim of this randomized controlled trial was to evaluate the safety and efficacy of neodymium: yttrium aluminum garnet laser treatment of lichen sclerosus (LS) by comparing it with topical corticosteroid treatment.

**METHODS:** A total of 40 female patients with vulvar LS were randomized 1:1 into a study (laser) group and a control (topical corticosteroids) group. The laser group received three laser treatments. Blinded evaluators evaluated biopsies and graded improvement on clinical photographs at baseline and at 3 months. Patients graded the intensity of symptoms on a 0 to 10 visual analogue scale at baseline and 1-, 3-, and 6-month follow-up. Patients also rated the tolerability of laser treatments, and side effects were monitored. (Canadian Task Force classification I) **RESULTS:** Laser treatment discomfort was on average 1.5 of 10 on the visual analogue scale. At 1- and 3-month follow-up, patients in the laser group had significantly greater improvement in LS symptoms (burning, itching, pain, and dyspareunia), better patient satisfaction, and greater reduction of sclerosis than patients in the topical corticosteroid group. At 6-month follow-up, the improvement of symptoms in the laser group was still significant. The correct order of photographs (before and after treatment) was assigned significantly more often in the laser-treated patients compared with the control group.

**CONCLUSION:** Laser therapy for LS caused minimal patient discomfort during the treatment, with no adverse effects, and demonstrated better efficacy than in the control group, with significant improvement lasting up to 6 months. Laser therapy is a promising option for patients not responding to topical corticosteroid therapy or patients wishing to reduce long-term corticosteroid maintenance use.

Tarcan, Tufan, MD<sup>15</sup>; De, Elise J. B., MD<sup>16</sup>; Stockdale, Colleen K., MD, MS<sup>17</sup>

Journal of Lower Genital Tract Disease: April 2019 - Volume 23 - Issue 2 - p 151–160

doi: 10.1097/LGT.0000000000000462

Benign Vulvovaginal Disorders

advantages of  
ed devices in  
be recommended  
al trials have  
r long-term  
ety, and efficacy....

# Post-market, prospective, randomized, sham-controlled clinical trial designed to confirm the efficacy and safety of the Fotona Smooth<sup>®</sup> device to treat female stress urinary incontinence

---

- 10 Centres
- Approximately 120 - 2:1 allocation to Active:sham group was used
- ...
- Urodynamic testing
- King's Health Questionnaire
- ICIQ-UI short form questionnaire
- 3-day Voiding Diary<sup>1</sup>
- 1-hour Pad Weight Test
- Pelvic Organ Prolapse/Urinary Incontinence Sexual Function Questionnaire (PISQ-12)



## ADVANTAGES OF LASER THERAPY

---

- Ambulatory procedure
- Minimally invasive (no cutting, no bleeding, no ablation)
- Virtually painless, no anesthesia needed
- No special pre or post-op preparation
- No consumables
- Quick and easy procedure: 30-45 minutes
- High success rate





**We have come a long way - we have only just begun!**

**Harold P. Drutz Founding member of IUGA, 1976**