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# Genitourinary syndrome and vulvovaginal atrophy: an innovative non-ablative laser treatment with promising results

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## ABSTRACT

Menopause, physiological or iatrogenic, in a wide variety of expressions from the peri- to postmenopausal period, marks a significant transition in women's life, due to remarkable hormonal changes. The most common and impactful symptoms affect the vaginal and urogenital area, often referred to as genitourinary syndrome of menopause (GSM) and vulvovaginal atrophy (VVA). The onset of the condition is due to systemic and local estrogen deficiency, which can lead to symptoms such as irritation, itching, burning sensation, dryness, and dyspareunia. These symptoms can significantly affect both intimate health and psychological well-being. Despite their prevalence, vaginal symptoms are often under-reported and under-treated. The objective of this study was to retrospectively evaluate the clinical outcomes and tolerability of a novel non-ablative 1470 nm laser treatment (LadyLift®, Eufoton, Trieste, Italy) in women with GSM and VVA. Thirty-four women with GSM and VVA were treated with the non-ablative 1470 nm LadyLift® laser procedure for three sessions, performed at 15-day intervals. A 6-month follow-up was performed and an adjunctive Ladylift® session was assessed as maintenance. A 7-points questionnaire was submitted before the first session and after 6 months, leading to an objective measurement of individual perception of symptoms. The study was conducted in accordance with the Declaration of Helsinki. The self-perception questionnaire revealed an approximately 33% reduction in vaginal dryness, 32% reduction in lacerations, 33% reduction in itching and/or burning sensation, 40% reduction in genitourinary infections, 30% reduction in incontinence, 26% reduction in dyspareunia, and 35% reduction in post-coital pain after three sessions. In this retrospective pilot study, non-ablative 1470 nm laser treatment (LadyLift®) was associated with significant improvement in several GSM- and VVA-related symptoms in perimenopausal, natural postmenopausal, and iatrogenic menopausal women. The treatment proved to be a safe, effective, and well-tolerated therapeutic option, leading to early and clinically meaningful improvements in vaginal health and pain symptoms, with no reported side effects or downtime following the procedure. Although the findings are encouraging, the progressive reduction in symptom relief over time suggests that maintenance or periodic treatment sessions may be required to sustain the clinical benefits. Further prospective controlled studies with larger cohorts, longer follow-up periods, validated outcome measures, and subgroup statistical analyses are warranted to better define efficacy, durability of response, optimal patient selection, and treatment protocols.

**Key words:** menopause; genitourinary symptoms; incontinence; dyspareunia; Ladylift®.

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## Introduction

Menopause (physiological or iatrogenic, in a varying expression from peri- to postmenopausal period) marks a significant transition in women's life, due to remarkable hormonal changes. The most common and impactful symptoms affect the vaginal and urogenital area, often referred to as genitourinary syndrome of menopause (GSM) and vulvovaginal atrophy (VVA). The onset of the condition is due to systemic and local estrogen deficiency, which can lead to symptoms such as irritation, itching, burning sensation, dryness, and dyspareunia. These symptoms can significantly affect both intimate health and psychological well-being. Despite their prevalence, vaginal symptoms are often under-reported and under-treated. A 2024 analysis published in *Clinical Obstetrics & Gynecology* highlights that prevalence estimates for GSM vary widely, largely due to differences in the populations studied, the diagnostic criteria applied, and the data collection methods used.[1]

### *Objectives*

We herein report our retrospective experience on several vaginal symptoms reduction obtained with a new therapeutic approach. Three sessions at 15-day intervals with a non-ablative 1470 nm laser, up to 10 minutes (depending on the patient's sensitivity) has shown to be associated with symptomatic improvement in cases of vestibulodynia, dyspareunia, incontinence, and other genitourinary symptoms.

## Materials and Methods

A retrospective single-center study was conducted at our private practice (Treviso, Italy) on 34 patients aged between 38 and 70 years (mean 56.2 years), who presented with a variety of genitourinary tract symptoms. Some of them were objectively identifiable, such as mucosal dryness and laceration, recurrent infections, and incontinence. Additional symptoms were subjectively reported by patients and were found to significantly affect both physical and psychological well-being, ultimately contributing to an overall reduction in quality of life.
Of the 34 women, 7 had not yet reached confirmed menopause but were experiencing perimenopausal symptoms, 13 had undergone natural menopause, and the remaining 14 had a previous diagnosis of breast cancer and were undergoing surgery, radiotherapy, and adjuvant systemic treatment with leuprorelin, tamoxifen, or aromatase inhibitors, resulting in iatrogenic menopause.
At the first clinical evaluation, anamnestic data were collected and informed consent was signed. A non-validated 7-item symptom questionnaire was designed to assess both subjective and objective symptoms by using an ordinal 1-10 scale. Higher scores indicated greater symptom severity. The questionnaire was administered before treatment and at the follow-up visit to assess subjective symptom perception and subjective clinical responses.
The questionnaire included the following items: 1) How often do you feel vaginal dryness?; 2) Do you have any mucosal lacerations?; 3) How often do you feel vaginal itching or a burning sensation?; 4) Do you have recurrent genitourinary tract infections?; 5) Do you have urinary incontinence?; 6) Do you feel pain during intercourse (dyspareunia)?; 7) Do you have any discomfort after intercourse or any postcoital discomfort (burning, itching, dryness, *etc.*)? (Figure 1).
All enrolled patients underwent a treatment protocol consisting of three sessions performed at 15-day intervals using the new 1470 nm non-ablative laser device. A minimal amount of hydrogel was applied to facilitate the insertion of the handpiece (Figure 2) into the vaginal canal. The anatomy of the vaginal canal is a key factor to consider. It measures approximately 8-10 cm in length and 2.5-3.5 cm in diameter and is lined with a mucosal layer characterized by numerous folds, which enhance the extensibility of the wall, particularly during reproductive age. Therefore, it is essential to gently rotate the handpiece while gradually advancing it along the vaginal canal to ensure even energy distribution and maximize treatment efficacy. Specifically, the procedure was performed using a power setting of 2.0-2.5 W, with a total energy delivery of 600-800 J over three passes, using a retrograde approach along the vaginal canal. Each session lasted approximately 10 minutes, with treatment duration and intensity adjusted according to the patient's subjective perception of heat, to ensure both comfort and safety.
The procedure was repeated three times at 15-day intervals. A follow-up visit was performed 6 months later. The same questionnaire was administered before the optional maintenance session to assess changes in the outcomes over time. At the follow-up visit, 80% of patients underwent an additional treatment session to maintain the results previously achieved.

| Self assessment test an innovative test to increase patients' awareness of the subjective and usually underestimated symptoms of GSM ( score Min 1 - Max 10) . | | |
|---|---|---|
| 1 | How often do feel vaginal dryness? | 1 2 3 4 5 6 7 8 9 10 |
| 2 | Do you have any mucosal lacerations? | 1 2 3 4 5 6 7 8 9 10 |
| 3 | How often do feel vaginal itching or a burning sensation? | 1 2 3 4 5 6 7 8 9 10 |
| 4 | Do you have recurrent genitourinary tract infections? | 1 2 3 4 5 6 7 8 9 10 |
| 5 | Do you have urinary incontinence? | 1 2 3 4 5 6 7 8 9 10 |
| 6 | Do you feel pain during intercourse (dyspareunia)? | 1 2 3 4 5 6 7 8 9 10 |
| 7 | Do you have any discomfort after intercourse or any postcoital (burning, itching, dryness...)? | 1 2 3 4 5 6 7 8 9 10 |

**Figure 1.** Self assessment test. An innovative test to detect female intimate health status and increase awareness of usually underestimated subjective symptoms of GSM and VVA.

Descriptive statistics were used to summarize symptom scores before and after treatment. Due to the exploratory nature of the study and the limited sample size, analyses were primarily descriptive.
The study was conducted in accordance with the Declaration of Helsinki.


**Figure 2.** Ladylift® handpiece used in this study.

## Results

Clinical examination 6 months post-procedure confirmed increased vaginal tone, reduced dryness, and a hyperemic mucosal appearance, reflecting improved tissue tone and texture. The self-perception questionnaire revealed an approximately 33% reduction in vaginal dryness, a 32% reduction in the number of lacerations, a 33% reduction in itching and/or burning sensation, around a 40% reduction in genitourinary infections, a 28% reduction in incontinence symptoms, a 26% reduction in dyspareunia, and a 35% reduction in post-coital pain after three sessions.
A significant reduction in the incidence of genitourinary infections and an improvement in urinary continence parameters was also observed.
The inclusion of three different menopausal groups represents both a limitation and an original aspect of the study, intended to explore the potential applicability of the treatment across different clinical conditions.

## Discussion

In the perimenopausal and postmenopausal period, women frequently present with a range of genitourinary symptoms, including mucosal dryness, irritation, itching, burning sensations, and pain during or after intercourse (dyspareunia, bleeding), as well as urinary symptoms such as nocturia, urgency, incontinence, and recurrent infections. All these symptoms and clinical signs are summarized in GSM, which has been reported to affect approximately 48% of perimenopausal women and up to 90% of postmenopausal women.[1-3]
GSM and vulvodynia are frequently underreported, as many women may be unaware of their prevalence and of the availability of effective treatment options. Both conditions can substantially impair quality of life and are associated with an increased risk of psychological comorbidities, including depression and anxiety disorders.[4]
There is no single gold-standard treatment for genitourinary symptoms, and therapeutic decisions must be individualized based on several factors. Treatment strategy depends on symptom predominance (vaginal *vs.* urinary), patient age, prior treatment responses, and comorbidities that may influence the treatments (chronic glucocorticoid therapy, tamoxifen, aromatase inhibitors). Conservative approaches, including topical therapies, water-based lubricants, plant extracts, hyaluronic acid, and vaginal estrogen gels, are also commonly used to restore vaginal mucosal integrity and alleviate local symptoms. Pelvic floor physical therapy and botulinum toxin injections have been shown to improve urinary continence and enhance pelvic muscle function. Laser treatment may represent a complementary option, particularly in patients with contraindications to estrogen therapy, such as breast cancer survivors.[5-9]
A recent review on vaginal laser therapy for GSM noted that there has been an increase in the use of vaginal laser therapy globally over the last decade. Furthermore, a 2023 update from the European Urogynecology Association and the Australasian Menopause Society highlighted the growing clinical and market interest in laser treatments for vulvovaginal health, which is partly attributable to increased female life expectancy and greater awareness of conditions such as GSM.[10,11]
Several types of laser devices have been investigated and applied in the treatment of GSM in recent years. In 2018, Dodero *et al.* reported a case series of women treated with a non-ablative solid-state laser. Clinical improvements were observed after the first session, with the greatest benefits reported approximately two months after completion of the treatment protocol. Similarly, Vitale *et al.* conducted a single-center prospective study evaluating the efficacy and safety of non-ablative laser therapy for GSM.[12,13]
Furthermore, Stabile *et al.* studied the effect of Ladylift® (Eufoton, Trieste, Italy) in 18 postmenopausal women with diagnosed GSM and provoked vestibulodynia, with remarkable results in terms of pain reduction and improvement of vaginal health in general.[14]
By considering its mechanism, we decided to apply Ladylift® technology also to perimenopausal women who report symptoms of GSM and AVV to improve mucosal elasticity and lubrication, in addition to the progressive reduction of estrogen levels.
In our experience, all patients demonstrated clear and measurable clinical benefits following the laser procedure, including improvements in vaginal tone and mucosal hydration, as well as relief of genitourinary symptoms such as vaginal dryness, dyspareunia, and urinary discomfort.
These beneficial outcomes were also associated with an improvement in patient-reported quality of life. The procedure demonstrated a positive safety profile, with no significant adverse events reported. To preserve and optimize the observed therapeutic effects, a maintenance session is recommended approximately 6 months following the initial treatment.
Future prospective controlled studies comparing the three menopausal subgroups may help identify the patients

most likely to benefit from this therapeutic approach, supporting a more personalized treatment strategy.
We acknowledge that the present study has several limitations, including its retrospective design, the absence of a control group, the heterogeneity of the study population, and the use of a non-validated questionnaire. In addition, future investigations would benefit from the incorporation of objective assessment tools, such as advanced cytological analyses, colposcopic evaluation, and digital imaging techniques, in order to further strengthen the methodological robustness of the findings. Therefore, the results should be interpreted with caution, particularly with regard to treatment efficacy.

## Conclusions

Ladylift® proved to be a safe, effective, and well-tolerated therapeutic option for women with GSM and VVA. Patients experienced significant and early improvements in both vaginal health and pain symptoms, with no side effects and downtime reported during the treatment. While the results were encouraging, the observed reduction in symptom relief over time indicates that ongoing or periodic treatment sessions may contribute to maintaining the clinical benefits. Although the findings are encouraging, further prospective controlled studies involving larger patient cohorts, validated outcome measures, and dedicated subgroup statistical analyses are warranted to more accurately define treatment efficacy, durability of response, optimal patient selection, and the most effective treatment protocols.

**Contributions:** all authors contributed equally to this work. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

**Conflict of interest:** Michele Boninsegna is an employee of Eufoton, the manufacturer of the device evaluated in this study. Eufoton had no role in the study design, data collection, data analysis, manuscript preparation, or the decision to publish. The other authors declare no conflict of interest.

**Ethics approval and consent to participate:** ethics approval was not required. Written consent to participate was obtained from all study participants.

**Availability of data and materials:** the datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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