

Non - invasive management and treatment of female stress urinary incontinence with a CO₂ LASER

Bader Alexandros

Obstetrician - Gynecologist, Athens, Greece

Correspondence

Bader Alexandros, Keep Femina Medical Center, 20 Zerva St, Glyfada, GR - 16675, Athens, Greece

E - mail: doctorbader@gmail.com

Abstract

Urinary incontinence affect millions of people worldwide, seriously impairing their quality of life. "FemiLift" CO₂ laser works very well in treating symptoms of stress urinary incontinence. The laser stimulates the production of collagen and elastin, which in turn thickens the wall of the vagina putting pressure on adjacent structures, such as the urethra. We present a case of successful use of "Femi-

Lift" non - ablative CO₂ laser in three sessions in a woman suffering from stress urinary incontinence with complete remission of the symptoms achieved already after the second session.

Keywords: Stress urinary incontinence; CO₂ laser application; FemiLift; collagen remodeling

Stress urinary incontinence (SUI) is defined as involuntary urine leakage. This is a very common disorder among women with history of multiple vaginal deliveries or with an obstructed labor. SUI is considered one of the most distressing problems, especially for younger women, with severe quality of life implications. SUI is caused by the loss of urethral support, usually as a consequence of the supporting structural muscles in the pelvis. Histological changes in the vaginal wall structure also have an important effect on the support system of the urethra's underside, especially under the middle urethra. These patients usually report leakage of a small amount of urine during activities that increase abdominal pressure such as coughing, sneezing and lifting of heavy weights¹⁻⁶.

We report a case of treatment of a patient with SUI using non - ablative CO₂ laser under the middle ure-

thra with a three session repetition once a month which showed a distinctive and reportable improvement of the symptoms.

Case Report

Our patient was a 50 year - old gravida 1 para 1 woman, who had delivered vaginally 16 years ago. The patient was complaining of a small amount of urine leakage since 6 years. She reported leakage symptoms during winter, especially with coughing and sneezing. She described changing 2 to 3 cotton pads a day when her coughing was getting worse. She also reported that she had done Kegel exercises for the last 8 months without notable improvement. She decided to visit our clinic because the situation had worsened with a noticeable bad impact on her personal life and her self - confidence.

The patient underwent urine analysis, gynecolog-

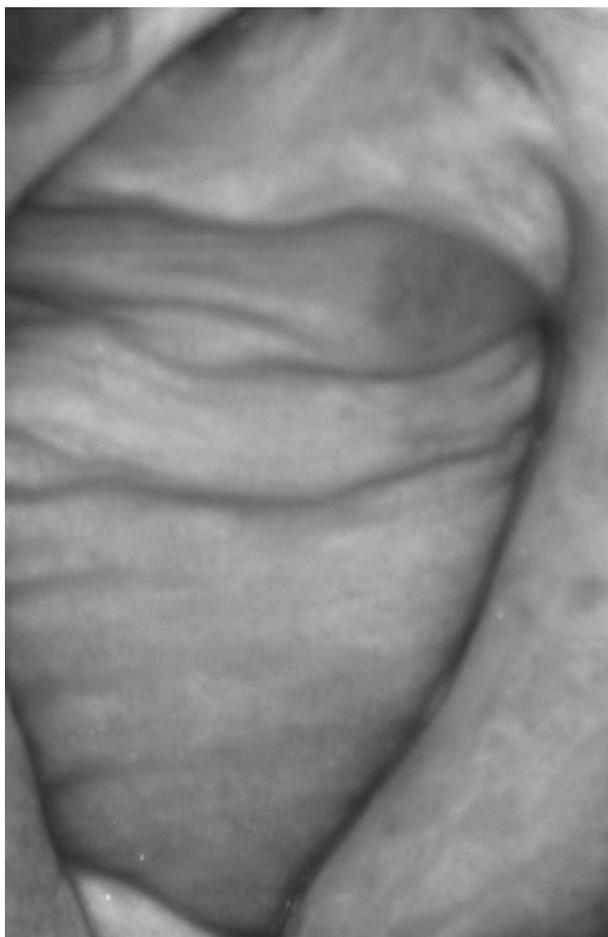


Figure 1. Colposcopic picture of the upper vaginal wall before the first application of "FemiLift" laser



Figure 2. Colposcopic picture of the upper vaginal wall after the first application of "FemiLift" laser

ical physical examination, transvaginal ultrasound, post - void bladder ultrasound, as well as cough test and Q - tip test.

The patient was informed of her various treatment options, with the recommendation to undergo non - invasive CO₂ laser method "FemiLift". The patient agreed to undergo three sequential sessions, one every four weeks. We targeted the mid - urethral underside space with non - ablative CO₂ laser beam.

During the first session, we performed the application under the middle urethra in three positions: 1cm distal of the middle urethra level, directly under the middle urethra, and 1cm before the middle urethral level, with application of 110mJ per pulse with high laser mode and frequency of 0.5 Hz.

This protocol was repeated with the same settings for three passes on the same positions during the same session. The treatment was performed without the use of any kind of anesthesia and the total duration of each application was 20 minutes to completion. The patient was advised to avoid sexual intercourse for 3 days. The same protocol was repeated for another two sessions, four and eight weeks following the 1st session. Written informed consent was obtained from the patient for publication of this case report and accompanying images (Figures 1 - 4).

Discussion

Female SUI is defined as the involuntary loss of

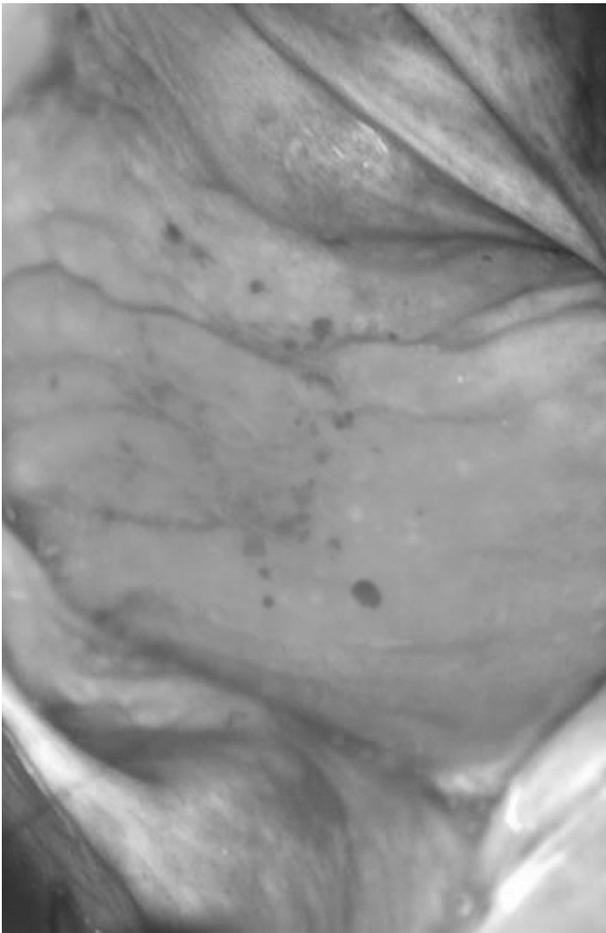


Figure 3. Colposcopic picture of the vaginal wall one month after the application of the second session of "FemiLift" laser

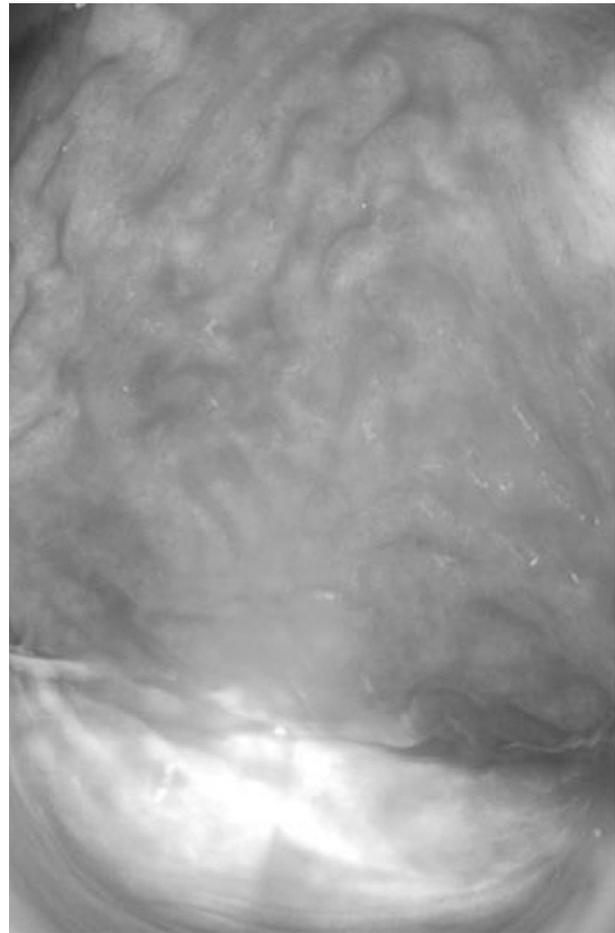


Figure 4. Colposcopic picture of the vaginal wall one month after the application of the third session of "FemiLift" laser

small, moderate or large amounts of urine during activities that require increased stress, such as exercise, coughing, sneezing, running, lifting weights or even changing body positions. It is mainly attributed to the inability of the urethral sphincter to function adequately. The etiology of stress incontinence is multifactorial and its possible causes include: 1) pregnancy. 2) vaginal delivery. During a traumatic delivery with concurrent damage of the pudendal nerve that leads to denervation of the pelvic floor muscles and the urethral sphincter. This damage usually appears after multiple deliveries. 3) Relaxation of the pelvic floor. This has an important effect on the gradual development of stress incontinence. The relaxation of the muscles and ligaments

and the additional damage to the tissue structures of the vaginal tissue under the urethra often leads to the establishment of stress incontinence. 4) Pelvic floor surgery. The damage of the pelvic nerves during an extensive pelvic surgery may eliminate the innervation of the urethra. These neurological causes can potentially disrupt the mechanism of continence. 5) Lifestyle. Increased abdominal stress and dilation of the perineal muscles (lifting weights) contribute to the formation of incontinence. 6) Predisposing factors include advanced age, race, family predisposition, and anatomical abnormalities. 7) Additional risk factors, include smoking, menopause, limited exercise, chronic cough, chronic constipation and obesity¹⁻⁶.

The treatment of this condition is usually invasive, either by applying conventional surgery or supportive materials, incontinence tapes and slings under the urethra that support the floor and improve or stop this annoying symptom for women. Unfortunately very often and despite the clinical trials that have been conducted and published, the latter method is being used less and less in many countries of the world because of the multiple complications it causes.

A new idea that has recently been applied for improving or treating female stress incontinence involves the application of CO₂ laser in patients with symptoms of relaxation of the pelvic floor and the vaginal wall under the urethra.

It has been studied that the use of this laser technology in various tissues, such as the skin and gums, which have a substantially similar tissue structure with the vagina, activates the regeneration and reproduction of collagen. Collagen is a substance that plays an important role in tissue quality and elasticity and contributes to increasing its total thickness and therefore its abundant presence contributes to the health and better functionality of tissues adjacent to the middle section of the urethra, thus leading to improved support thereof, ultimately resulting in improving or fully restoring moderate stress incontinence⁷⁻¹⁵.

The diagnostic approach to these women involves detailed individual and obstetric history, urodynamic study, Papanicolaou cytological examination and a pregnancy test and a urine test before every session.

The application of a CO₂ laser with fractional pixel (i - pixel) technology protects from tissue ablation and causes thermal damage only. This controlled damage is caused by a special laser head, introduced in the vagina and focused in the anatomic area under the urethra. The required energy for the laser is 30 Watts and comes from the head that produces 81 pixels concentrated over a 1cm x 1cm area. The energy range of 100mJ is equally distributed in the 81 pixels, in order to safely and precisely achieve the necessary thermal damage to the tissues. It has been studied that, with this amount of energy, the

laser penetrates the skin at a depth of 200 to 400 microns, a completely safe distance, far from the vital organs while being conducive to regeneration and ultimately to the reproduction of new collagen. The treatment is done in three successive 10 - minute sessions. Every session is performed four weeks after the previous one. The results are usually apparent after the second application and reach their peak six months after the end of the third session, the time required for the collagen regeneration process to be completed. The sessions are painless and can be done in a simple practice. No anesthesia is needed and patients can immediately return to their daily routine on the same day⁷.

Conclusion

We presented a case of successful use of "FemiLift" non - ablative CO₂ laser in three sessions in a woman suffering from SUI with complete remission of the symptoms achieved already after the second session. ■

Conflict of interest

The author declares no conflict of interest.

References

1. Carr L, Corcos J. Stress urinary incontinence: A case-based discussion. *Can Urol Assoc J* 2012;6(5 Suppl 2):S125-6.
2. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. *Am J Obstet Gynecol* 2002;187:116-26.
3. Brown JS, Grady D, Ouslander JG, Herzog AR, Varnier RE, Posner SF. Prevalence of urinary incontinence and associated risk factors in postmenopausal women. *Heart & Estrogen/Progestin Replacement Study (HERS) Research Group. Obstet Gynecol* 1999;94:66-70.
4. Buchsbaum GM, Chin M, Glantz C, Guzik D. Prevalence of urinary incontinence and associated risk factors in a cohort of nuns. *Obstet Gynecol* 2002;100:226-9.

5. Wood LN, Anger JT. Urinary incontinence in women. *BMJ* 2014;349:g4531.
6. Cervigni M, Gambacciani M. Female urinary stress incontinence. *Climacteric* 2015;18 (Suppl 1):30-6.
7. Elias JA, Larrazabal A, Dobanton F. FEMILIFT: A New tool to treat urinary continence disorders. <http://www.fitzwilliamprivateclinic.ie/wp-content/uploads/2014/02/FEMILIFT-CLINICAL-TRIALS-PAPER.pdf>
8. Fitzpatrick RE. CO₂ laser resurfacing. *Dermatol Clin* 2001;19:443-51.
9. Manstein D, Herron GS, Sink RK, Tanner H, Anderson RR. Fractional photothermolysis: a new concept for cutaneous remodeling using microscopic patterns of thermal injury. *Lasers Surg Med* 2004;34:426-38.
10. Tierney EP, Kouba DJ, Hanke CW. Review of fractional photothermolysis: treatment indications and efficacy. *Dermatol Surg* 2009;35:1445-61.
11. Hantash BM, Bedi VP, Kapadia B, et al. In vivo histological evaluation of a novel ablative fractional resurfacing device. *Lasers Surg Med* 2007;39:96-107.
12. Rahman Z, MacFalls H, Jiang K, et al. Fractional deep dermal ablation induces tissue tightening. *Lasers Surg Med* 2009;4:78-86.
13. Orringer JS, Sachs DL, Shao Y, et al. Direct quantitative comparison of molecular responses in photodamaged human skin to fractionated and fully ablative carbon dioxide laser resurfacing. *Dermatol Surg* 2012;38:1668-77.
14. Ogrinc UB, Senčar S, Lenasi H. Novel minimally invasive laser treatment of urinary incontinence in women. *Lasers Surg Med* 2015;47:689-97.
15. Khalafalla MM, Elbiaa AAM, Abdelazim IA, Husain M. Minimal invasive laser treatment for female stress urinary incontinence. *Obstet Gynecol Int J* 2015;2:00035.