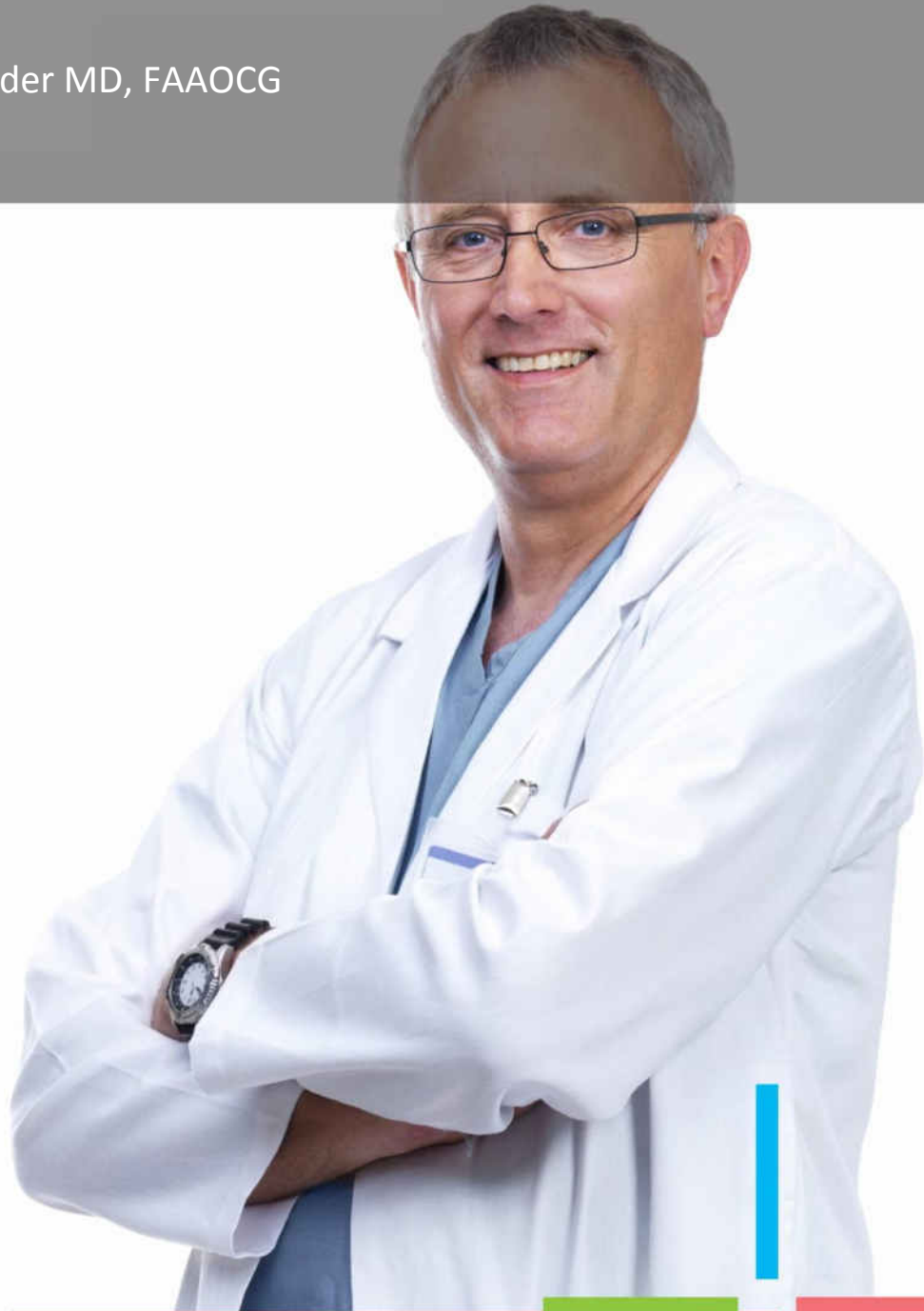


# Case-study non invasive Treatment of SUI with CO2

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# Non Invasive Treatment of SUI with CO2 Laser

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## Introduction:

Stress Urinary Incontinence (SUI) is defined as involuntary urine leakage. This is a very common phenomenon among young women with history of multiple vaginal deliveries or with one destructive delivery. SUI is considered one of the most distressing problems for young females with a distinct element of quality of life implications. SUI is caused due to the loss of urethral support, usually as a consequence pelvic support structure damage. Histological changes in the vaginal wall structure, also has an important affect on the support system of the urethra underside, especially under the mid 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 weights.

Treatment using non ablative CO2 Laser energy under the mid urethra with a three (3) session repetition once a month shows a distinctive and reportable improvement of the symptoms.

## Keywords:

Stress Urinary Incontinence, CO2 Laser application, FemiLift, collagen remodeling.

## Case Presentation:

Our patient is 50 Years old G1 P1, who gave her vaginal delivery 16 years ago. The patient is complaining of a small amount of urine leakage since 6 years. She reports leakage symptoms during winter time, especially with coughing and sneezing. She describes that she changes 2 to 3 cotton pads a day when her coughing is getting worse. Patient reports one to two drops every time she sneezes or coughs. Patient reports that she practices Kegel exercises for the last 8 months without notable improvement. She decided to visit us because the situation had started to get worse with a noticeable bad impact on her personal life and her self-confidence.

The patient was advised to undergo some tests and exams which would be followed by a discussion regarding the various treatment options.

The patient had undergone the following tests and exams:

- Urinalysis: To confirm non urine infections. Results were negative.
- Normal Ultrasound: To image the uterus and verify non myomas or any mass in the area. Results were negative
- Post voidal Ultrasound: To measure any residual urine inside the bladder. Results show non-significant quantity of urine in the bladder

- Cough test: Done with patient standing and pressure on her knees. We asked her to cough after drinking 1 liter of water. Results show, loss of 2 drops of urine every time the patient was coughing
- Q Test: To find out if the patient is suffering from hyper mobility of the urethra. Results show tip elevation of only 20%, which is non-indictable to hyper mobility of the urethra



**Figure 1: Colposcopy Picture of the upper vaginal wall before the 1<sup>st</sup> application with Non Ablative CO2 Laser, “FemiLift”**

The patient was informed of her various treatment options, with the recommendation to undergo Noninvasive CO2 Laser method “**FemiLift**” as the safest treatment option for her case. Consideration of this recommendation was due to the zero down time, the zero pain and most importantly, the fact that she is likely to have the same high improvement percentage or complete healing likelihood as with the surgical option.

### **Method:**

As explained before, the anatomical defect in this case is the loss of support from complex of tissues under the mid urethra. In our current case, we will target the mid urethral underside space with non-ablative CO2 Laser beam. The application power needs to be strong enough in order to stimulate the collagen and elastic fibers in the sub-mucosal space. With the non-Ablative CO2 “**FemiLift**” we have the advantage of non-sharing the tissues in comparison with a fractional CO2 scanners while also working deep enough for better stimulation in comparison to Erbium Lasers.

Prior to beginning treatment, we follow a certain protocol. We ask the patient to undergo the following tests:

- Pap smear. Negative for any cervical or vaginal malignancy, HPV, HSV
- Pregnancy test: Negative

The patient agreed to undergo three (3) sequential sessions, one every four (4) weeks.

During the first session, we performed the application under the mid urethra in three positions:

- 1cm distal of the mid urethra level. Application with 110mj/ppl with high laser mode and 0,5 Hz
- Directly under the mid urethra. Application with 110mj/ppl with high laser mode and 0,5 Hz

- 1cm before the mid urethral level. Application with 110mj/ppl with high laser mode and 0,5 Hz

This protocol was repeated with the same settings for three passes on the same positions during the same session.

The treatment has been performed without the use of any kind of anesthesia. The total duration of the application was 20 minutes, to completion.

The patient was advised to avoid sexual intercourse for 3 days.

The same protocol has been repeated for another two sessions. Four and eight weeks following the 1<sup>st</sup> session.



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**Figure 2: Colposcopy Picture of the upper vaginal wall after the 1<sup>st</sup> application with Non Ablative CO2 Laser "FemiLift"**

## Discussion:

This case describes treatment of SUI using "Femilift" a Non ablative CO2 Laser technology. Following several tests and special exams, our patient was considered a good candidate for this treatment. The goal of using this laser technology is to achieve new collagen remodeling and elastic fibers recreation in the tissues under the mid urethra. Laser penetration is safe and does not exceed 500 microns. Using "Femilift" a Non ablative CO2 Laser in the mid urethra region gives us the advantage of affecting the tissue with thermal damage for a period of 48-72 hours after application. This process will create edema in the surrounding tissues; will release chemical mediators causing shrinkage of the collagen. On the main time, the changes in the cellular level are rapid and transient, and are characterized by the production of a small family of proteins termed "Heat Shock Proteins (HSP)", which can be defined as the temporary change in cellular metabolism.

HSP 70, which is commonly found following laser irradiation, could play a role transforming TGF-beta growth factor. TGF-beta is known to be a key element in inflammatory and fibrogenic response. In this process, the fibroblasts are the key cells, since they produce collagen and extracellular matrix. During the proliferation phase (30 days) following application, Fibroblast recruitment will take place with the creation of new dermal molecular and new collagen fibers replacing the old one. The final phase will be the remodeling phase, with placement of mature collagen fibers and increase of collagen fiber strain, to finally achieve new elastic fibers.

The goal of treatment is to achieve enough collagen remodeling and fibroblasts recreation to ultimately increase the thickness of the vaginal wall in the area in order to increase the support of the mid urethra underside. This would give the patient continence lasting for

approximately 2 years. A memory session one year after the last application is recommended, in order to keep the collagen in continuous recreation.

### Conclusion:

In Conclusion, performing the Stress Urinary Incontinence SUI procedure using “FemiLift” Non ablative CO2 Laser in three sessions., Complete cure of the symptoms was achieved after the 2<sup>nd</sup> session. Patient reported no leakage anymore while coughing or sneezing. Cotton pads test for 2 weeks was negative. Office coughing test was negative. Patient was advised to return after one year for re-assessment and a memory session.

### Patient Satisfactory Rate:

	1	2	3	4	5
Pain during procedure					•
Pain after procedure				•	
Satisfactory after 1 <sup>st</sup> session		•			
Satisfactory after 2 <sup>nd</sup> session					•
Satisfactory after 3 <sup>rd</sup> session					•

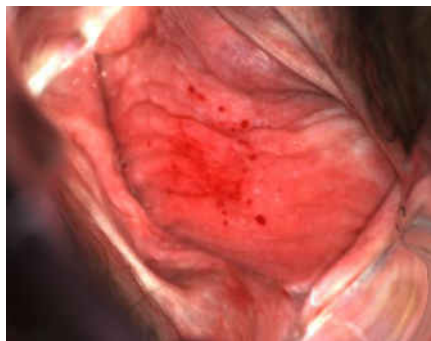


Figure 3: Colposcopy Picture of the vaginal wall one month after the application of 2nd session of Non Ablative CO2 Laser “FemiLift”

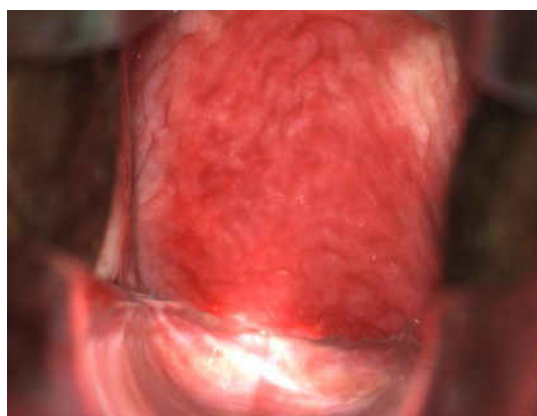


Figure 4: Colposcopy Picture of the vaginal wall one month after the application of 3rd session of Non Ablative CO2 Laser “FemiLift”

## **Consent:**

A Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of this consent is available for review if needed.

## **Competing interests:**

The author declares that he has no competing interests.

## **Literature list:**

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