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[A 12-week treatment with fractional CO₂ laser for vulvovaginal atrophy: a pilot study.](#)

Salvatore S., Nappi R., Zerbinati N., Calligaro A., Ferrero S., Origoni M., Candiani M., Leone Roberti Maggiore U. *Climacteric*. 2014 Aug; 17, No. 4:363-369. doi: 10.3109/13697137.2014.899347. Epub 2014 Jun 5.

Abstract

OBJECTIVE:

This pilot study aimed to assess the efficacy and feasibility of fractional CO₂ laser in the treatment of vulvovaginal atrophy (VVA) in postmenopausal women.

METHODS:

VVA symptoms were assessed before and after three applications of laser over 12 weeks in 50 women (age 59.6 ± 5.8 years) dissatisfied with previous local estrogen therapies. Subjective (visual analog scale) and objective (Vaginal Health Index Score, VHIS) measures were used during the study period to assess VVA. Quality of life was measured by using the SF-12. A subjective scale to evaluate the degree of pain related to the laser application and the degree of difficulty to perform the laser procedure was used.

RESULTS:

Fractional CO₂ laser treatment was effective to improve VVA symptoms (vaginal dryness, vaginal burning, vaginal itching, dyspareunia, dysuria; $p < 0.001$) at 12-week follow-up, as well as the VHIS (13.1 ± 2.5 at baseline vs. 23.1 ± 1.9 ; $p < 0.001$). Both physical and mental scores of quality of life were significantly improved in comparison with baseline ($p < 0.001$). Satisfaction with the laser procedure was reported by 42 women (84%) and a minimal discomfort was experienced at the first laser application, mainly because of the insertion and the movements of the probe. Finally, the technique was very easy to perform in all women starting from the second application at week 4 and no adverse events were recorded during the study period.

CONCLUSIONS:

A 12-week treatment with the fractional CO₂ laser was feasible and induced a significant improvement of VVA symptoms by ameliorating vaginal health in postmenopausal women. Further controlled studies should be performed to confirm the present data and to assess the long-term effects of the laser procedure on vaginal tissues.



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[Microablative fractional CO₂ laser improves dyspareunia related to vulvovaginal atrophy: a pilot study.](#)

Salvatore S., Leone Roberti Maggiore U., Parma M., Quaranta L., Sileo F., Cola A., Baini I., Ferrero S., Orioni M., Zerbini N.- *Journal of Endometriosis and Pelvic Pain Disorders*. 2014; 6(3): 150 – 156. doi:10.5301/je.5000184. Epub 2014 Jun 20.

Abstract

OBJECTIVE:

This pilot study aimed to assess the efficacy in treating sexually active menopausal patients who had dyspareunia related to vulvovaginal atrophy (VVA).

METHODS:

The intensity of VVA symptoms was recorded for each patient. Patients were administered the Short Form 12 (SF-12) and the female sexual function index (FSFI) to assess quality of life and sexual function, respectively. An objective evaluation of female urogenital health was performed using the Gloria Bachman Vaginal Health Index (VHI).

RESULTS:

At 12-week follow-up, the laser treatment was efficacious in improving dyspareunia in 100% of patients included in the study (n = 15). The intensity of dyspareunia significantly decreased from baseline (8.7 ± 1.0) to 12-week follow-up (2.2 ± 1.0 ; $p < 0.001$). In addition, all other VVA symptoms significantly ameliorated at the same follow-up. Furthermore, after the treatment, a significant improvement in quality of life (QoL) and sexual function were shown.

CONCLUSIONS:

This pilot study demonstrated that treatment with the microablative fractional CO₂ laser of patients with dyspareunia related to VVA was efficacious at 12-week follow-up.

[Microscopic and ultrastructural modifications of postmenopausal atrophic vaginal mucosa after fractional carbon dioxide.](#)

Zerbinati N., Serati M., Origoni M., Candiani M., Iannitti T., Salvatore S., Marotta F., Calligaro A. *Lasers in Medical Science*. 2015 Jan; 30, No. 1:429-36. doi: 10.1007/s10103-014-1677-2. Epub 2014 Nov 20.

Abstract

Vaginal atrophy occurring during menopause is closely related to the dramatic decrease in ovarian estrogens due to the loss of follicular activity. Particularly, significant changes occur in the structure of the vaginal mucosa, with consequent impairment of many physiological functions. In this study, carried out on bioptic vaginal mucosa samples from postmenopausal, nonestrogenized women, we present microscopic and ultrastructural modifications of vaginal mucosa following fractional carbon dioxide (CO₂) laser treatment. We observed the restoration of the vaginal thick squamous stratified epithelium with a significant storage of glycogen in the epithelial cells and a high degree of glycogen-rich shedding cells at the epithelial surface. Moreover, in the connective tissue constituting the lamina propria, active fibroblasts synthesized new components of the extracellular matrix including collagen and ground substance (extrafibrillar matrix) molecules. Differently from atrophic mucosa, newly-formed papillae of connective tissue indented in the epithelium and typical blood capillaries penetrating inside the papillae, were also observed. Our morphological findings support the effectiveness of fractional CO₂ laser application for the restoration of vaginal mucosa structure and related physiological trophism. These findings clearly coupled with striking clinical relief from symptoms suffered by the patients before treatment.



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[Histological study on the effects of microablative fractional CO₂ laser on atrophic vaginal tissue: an ex vivo study.](#)

Salvatore S., Leone Roberti Maggiore U., Athanasiou S., Origoni M., Candiani M., Calligaro A., Zerbinati N. *Menopause*. 2015 Aug; 22(8):845-9. doi: 10.1097/GME.0000000000000401.

Abstract

OBJECTIVE:

Microablative fractional CO₂ laser has been proven to determine tissue remodeling with neof ormation of collagen and elastic fibers on atrophic skin. The aim of our study is to evaluate the effects of microablative fractional CO₂ laser on postmenopausal women with vulvovaginal atrophy using an ex vivo model.

METHODS:

This is a prospective ex vivo cohort trial. Consecutive postmenopausal women with vulvovaginal atrophy managed with pelvic organ prolapse surgical operation were enrolled. After fascial plication, the redundant vaginal edge on one side was treated with CO₂ laser (SmartXide²; DEKA Laser, Florence, Italy). Five different CO₂ laser setup protocols were tested. The contralateral part of the vaginal wall was always used as control. Excessive vagina was trimmed and sent for histological evaluation to compare treated and nontreated tissues. Microscopic and ultrastructural aspects of the collagenic and elastic components of the matrix were studied, and a specific image analysis with computerized morphometry was performed. We also considered the fine cytological aspects of connective tissue proper cells, particularly fibroblasts.

RESULTS:

During the study period, five women were enrolled, and 10 vaginal specimens were finally retrieved. Four different settings of CO₂ laser were compared. Protocols were tested twice each to confirm histological findings. Treatment protocols were compared according to histological findings, particularly in maximal depth and connective changes achieved. All procedures were uneventful for participants.

CONCLUSIONS:

This study shows that microablative fractional CO₂ laser can produce a remodeling of vaginal connective tissue without causing damage to surrounding tissue.



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[Sexual function after fractional microablative CO₂ laser in women with vulvovaginal atrophy.](#)

Salvatore S., Nappi R., Parma M., Chionna R., Lagona F., Zerbinati N., Ferrero S., Origoni M., Candiani M., Leone Roberti Maggiore U – *Climacteric*. 2015 Apr; 18(2):219-25. doi: 10.3109/13697137.2014.975197. Epub 2014 Dec 16.

Abstract

OBJECTIVE:

To investigate the effects of fractional microablative CO₂ laser on sexual function and overall satisfaction with sexual life in postmenopausal women with vulvovaginal atrophy (VVA).

METHOD:

This prospective study included 77 postmenopausal women (mean age 60.6 ± 6.2 years) treated for VVA symptoms with the fractional microablative CO₂ laser system (SmartXide² V²LR, Monalisa Touch, DEKA, Florence, Italy). Sexual function and quality of life were evaluated with the Female Sexual Function Index (FSFI) and the Short Form 12 (SF-12), respectively, both at baseline and at 12-week follow-up. A 10-mm visual analog scale was used to measure the overall satisfaction with sexual life and the intensity of VVA symptoms (vaginal burning, vaginal itching, vaginal dryness, dyspareunia and dysuria) before and after the study period.

RESULTS:

We observed a significant improvement in the total score and the scores in each specific domain of the FSFI at 12-week follow-up compared to baseline ($p < 0.001$). After concluding the laser treatment, the overall satisfaction with sexual life significantly improved ($p < 0.001$). Seventeen (85%) out of 20 (26%) women, not sexually active because of VVA severity at baseline, regained a normal sexual life at the 12-week follow-up. Finally, we also found a significant improvement in each VVA symptom ($p < 0.001$) and in quality-of-life evaluation, both for the scores in the physical ($p = 0.013$) and mental ($p = 0.002$) domains.

CONCLUSIONS:

Fractional microablative CO₂ laser treatment is associated with a significant improvement of sexual function and satisfaction with sexual life in postmenopausal women with VVA symptoms.



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[Vulvo-vaginal atrophy: a new treatment modality using thermos-ablative fractional CO₂ laser.](#)

Perino A., Calligaro A., Forlani F., Tiberio C., Cucinella G., Svelato A., Saitta S., Calagna G. *Maturitas*. 2015 Mar; 80(3):296-301. doi: 10.1016/j.maturitas.2014.12.006. Epub 2014 Dec 25.

Abstract

OBJECTIVE:

To evaluate the efficacy and feasibility of thermo-ablative fractional CO₂ laser for the treatment of symptoms related to vulvo-vaginal atrophy (VVA) in post-menopausal women.

METHODS:

From April 2013 to December 2013, post-menopausal patients who complained of one or more VVA-related symptoms and who underwent vaginal treatment with fractional CO₂ laser were enrolled in the study. At baseline (T0) and 30 days post-treatment (T1), vaginal status of the women was evaluated using the Vaginal Health Index (VHI), and subjective intensity of VVA symptoms was evaluated using a visual analog scale (VAS). At T1, treatment satisfaction was evaluated using a 5-point Likert scale.

RESULTS:

During the study period, a total of 48 patients were enrolled. Data indicated a significant improvement in VVA symptoms (vaginal dryness, burning, itching and dyspareunia) ($P < 0.0001$) in patients who had undergone 3 sessions of vaginal fractional CO₂ laser treatment. Moreover, VHI scores were significantly higher at T1 ($P < 0.0001$). Overall, 91.7% of patients were satisfied or very satisfied with the procedure and experienced considerable improvement in quality of life (QoL). No adverse events due to fractional CO₂ laser treatment occurred.

CONCLUSION:

Thermo-ablative fractional CO₂ laser could be a safe, effective and feasible option for the treatment of VVA symptoms in post-menopausal women.

Fractional CO₂ laser for vulvovaginal atrophy (VVA) dyspareunia relief in breast cancer survivors.

Pieralli A., Fallani M.G., Becorpi A., Bianchi C., Corioni S., Longinotti M., Tredici Z., Guaschino S. *Archives of Gynecology and Obstetrics*. 2016 May 12. DOI 10.1007/s00404-016-4118-6. [Epub ahead of print]

Abstract

PURPOSE:

The aim of this study was to evaluate the efficacy of fractional CO₂ laser therapy in breast cancer survivors as a therapeutic method for vulvovaginal atrophy (VVA) dyspareunia.

METHODS:

50 patients (mean age 53.3 years) underwent fractional microablative CO₂ laser treatment for dyspareunia in oncological menopause (mean time of menopause 6.6 years). The Gloria Bachmann's Vaginal Health Index (VHI) score was chosen as system to evaluate the presence of VVA and its improvement after the treatment. Intensity of dyspareunia was evaluated using a visual analog scale (VAS).

RESULTS:

Data indicated a significant improvement in VVA dyspareunia ($p < 1.86e-22$) in breast cancer survivors who had undergone 3 sessions of vaginal fractional CO₂ laser treatment. Moreover, VHI scores were significantly higher 30 days post-treatment (T4) ($p < 0.0001$). 76 % of patients were satisfied or very satisfied with the treatment results. The majority (52 %) of patients were satisfied after a long-term follow-up (mean time 11 months). No adverse events due to fractional CO₂ laser treatment occurred.

CONCLUSIONS:

The treatment with fractionated CO₂ laser appeared to be a feasible and effective treatment for VVA dyspareunia in breast cancer survivors with contraindications to hormonal treatments.

[Is vaginal fractional CO₂ laser treatment effective in improving overactive bladder symptoms in post-menopausal patients? Preliminary results.](#)

Perino A., Cucinella G., Gugliotta G., Saitta S., Polito S., Adile B., Marci R., Calagna G. Eur Rev Med Pharmacol Sci. 2016 Jun;20(12):2491-7.

Abstract

OBJECTIVE:

To evaluate the role of vaginal fractional CO₂ laser treatment in the relief of Overactive Bladder (OAB) symptoms in post-menopausal women.

PATIENTS AND METHODS:

Post-menopausal women who complained of one or more symptoms related to vulvo-vaginal atrophy (VVA), who experienced symptoms of OAB and who underwent vaginal treatment with fractional CO₂ laser were enrolled in the study. At baseline (T0) and 30 days post-treatment (T1), vaginal status (using Vaginal Health Index - VHI), subjective intensity of VVA symptoms (using a visual analog scale - VAS) and micturition diary were evaluated. OAB symptoms were also assessed using a validated questionnaire.

RESULTS:

Thirty patients were enrolled. A statistically significant improvement in VVA symptoms was observed and in VHI at T1 ($p < 0.0001$). A significant improvement was also identified in the micturition diary, in number of urge episodes and OAB-q ($p < 0.0001$). Nine of the 30 patients suffered from incontinence episodes and had improved at T1.

CONCLUSIONS:

We showed that fractionated CO₂ laser vaginal treatment has proved to be effective in improving OAB symptoms in post-menopausal women. Moreover, it is a safe and efficacious measure for the relief of VVA related conditions. Further long-term studies are needed to confirm these preliminary results.



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[The Use of Pulsed CO₂ Laser for the treatment of Vulvovaginal atrophy](#)

Salvatore S., Athanasiou S., Candiani M. *Current Opinion in Obstetrics and Gynecology*. 2015 Dic; 27(6):504-8.
doi: 10.1097/GCO.000000000000230.

Abstract

PURPOSE OF REVIEW:

This article reviews the literature regarding the safety and efficacy of the use of a pulsed CO₂ laser for the treatment of vulvovaginal atrophy (VVA).

RECENT FINDINGS:

Prospective observational studies have demonstrated histological changes after the use of pulsed CO₂ laser vaginally in atrophic conditions. Increased collagen and extracellular matrix production has been reported together with an increase in the thickness of the vaginal epithelium with the formation of new papilla. Three different observational studies reported a significant improvement of VVA assessed subjectively (with a 10-point visual analogue scale) and objectively (using the Vaginal Health Index) after a cycle of three treatments of pulsed CO₂ laser. Also sexual function (assessed with the Female Sexual Function Index) and quality of life (evaluated with the SF12 questionnaire) significantly improved. No complications or side-effects were reported during or after the laser procedure that was performed in an outpatient setting.

SUMMARY:

Increasing evidence with histological and clinical data supports the use of pulsed CO₂ lasers in the treatment of VVA; however, no randomized control trial (sham versus treatment) has yet been produced and no data on the duration of therapy are currently available.

The effect of microablative fractional CO₂ laser on vaginal flora of postmenopausal women.

Athanasίου S., Pitsouni E., Antonopoulou S., Zacharakis D., Salvatore S., Falagas M.E., Grigoriadis T. *Climacteric*. 2016 Aug 24:1-7. [Epub ahead of print]

Abstract

OBJECTIVES:

To assess the effect of microablative fractional CO₂ laser (MFCO₂-Laser) therapy on the vaginal microenvironment of postmenopausal women.

METHODS:

Three laser therapies at monthly intervals were applied in postmenopausal women with moderate to severe symptoms of genitourinary syndrome of menopause, pH of vaginal fluid >4.5 and superficial epithelial cells on vaginal smear <5%. Vaginal fluid pH values, fresh wet mount microscopy, Gram stain and aerobic and anaerobic cultures were evaluated at baseline and 1 month after each subsequent therapy. Nugent score and Hay-Ison criteria were used to evaluate vaginal flora.

RESULTS:

Fifty-three women (mean age 57.2 ± 5.4 years) participated and completed this study. MFCO₂-Laser therapy increased Lactobacillus (p < 0.001) and normal flora (p < 0.001) after the completion of the therapeutic protocol, which decreased vaginal pH from a mean of 5.5 ± 0.8 (initial value) to 4.7 ± 0.5 (p < 0.001). The prevalence of Lactobacillus changed from 30% initially to 79% after the last treatment. Clinical signs and symptoms of bacterial vaginosis, aerobic vaginitis or candidiasis did not appear in any participant.

CONCLUSION:

MFCO₂-Laser therapy is a promising treatment for improving the vaginal health of postmenopausal women by helping repopulate the vagina with normally existing Lactobacillus species and reconstituting the normal flora to premenopausal status.



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[An assessment of the safety and efficacy of a fractional CO₂ laser system for the treatment of vulvovaginal atrophy.](#)

Sokol E.R., Karram M.M. *Menopause*. 2016 Oct; 23(10):1102-7. doi: 10.1097/GME.0000000000000700.

Abstract

OBJECTIVE:

The aim of the study was to assess the safety and efficacy of a novel fractional CO₂ laser for the treatment of genitourinary syndrome of menopause (GSM).

METHODS:

Women presenting with GSM and meeting study criteria were enrolled. Examinations at baseline and follow-up (3 mo after final treatment) evaluated dilator tolerance and vaginal pH. Visual analog scales were used to assess pain, vaginal burning, vaginal itching, vaginal dryness, dyspareunia, and dysuria; Vaginal Health Index scores were completed before each treatment and at follow-up; Female Sexual Function Index and Short Form 12 questionnaires were also completed. Participant satisfaction was measured on a 5-point Likert scale (1 ¼ very dissatisfied, 5 ¼ very satisfied). Women received three laser treatments, 6 weeks apart.

RESULTS:

Thirty women participated (mean age 58.6 8.8 y). None withdrew or were discontinued due to an adverse event; three were lost to follow-up. Average improvement in visual analog scale scoring was 1.7 3.2 for pain, 1.4 2.9 for burning, 1.4 1.9 for itching, 6.1 2.7 for dryness, 5.1 3.0 for dyspareunia, and 1.0 2.4 for dysuria; improvement in average Vaginal Health Index and Female Sexual Function Index scores were statistically significant ($P < 0.001$). Twenty-five of 30 participants (83%) showed increase in comfortable dilator size at 3-month follow up. Before the second and third treatments, 86.6% (26 of 30) of women reported they were better or much better than at the previous treatment; 26 of 27 women (96%) were reportedly satisfied or extremely satisfied at follow-up.

CONCLUSIONS:

In this sample, the data suggest that the fractional CO₂ laser is effective and safe for treatment of the symptoms associated with GSM. Key Words: Dyspareunia – Fractional CO₂ laser – Genitourinary syndrome of menopause – Menopause – Vaginal dryness – Vulvovaginal atrophy. Genit



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Fractional microablative CO₂ laser for vulvovaginal atrophy in women treated with chemotherapy and/or hormonal therapy for breast cancer: a retrospective study

Pagano T, De Rosa P, Vallone R, Schettini F, Arpino G, De Placido S, Nazzaro G, Locci M, De Placido G. *Menopause*. 2016 Oct; 23(10):1108-13. doi: 10.1097/GME.0000000000000672.

Abstract

OBJECTIVE:

Breast cancer is one of the most common malignancies in women. Hormonal treatment and chemotherapy induce a transient or permanent menopause status. Vulvovaginal atrophy (VVA) is a frequent debilitating symptom of menopause that is best treated with local or systemic estrogen formulations. Because estrogens drive the growth of the majority of breast cancers, most effective VVA therapies are precluded. The aim of this study was to evaluate the effects of fractional microablative CO₂ laser on sexual function and in relieving symptoms in women with breast cancer and VVA induced or exacerbated by iatrogenic menopause.

METHODS:

This retrospective study included 26 women affected by hormone-receptor positive breast tumors and treated for VVA symptoms with the fractional microablative CO₂ laser system. Every 30 to 40 days, women underwent a cycle of treatment for a total of three cycles. During each cycle, women underwent a gynecological examination and completed visual analog scale questionnaires designed to assess (1) the degree of symptoms and (2) procedure-related discomfort.

RESULTS:

Treatment resulted in a significant regression of VVA symptoms and procedure-related discomfort versus baseline ($P < 0.001$ in almost all cases). No adverse reactions were observed nor reported by women.

CONCLUSIONS:

Fractional microablative CO₂ laser treatment is associated with a significant improvement of VVA symptoms in women affected by hormone-driven breast cancer. This procedure has the advantage of relieving iatrogenic/physiological VVA symptoms without resorting to contraindicated estrogen preparations, which have been the most effective therapy thus far.

[The curative effect and feasibility analysis of fractional CO₂ laser in the treatment of vulvovaginal in postmenopausal women](#)

Miao Y., Li J., Wang J. *Chin J Clin Obstet Gynecol.* 2016 July; 17(4): 294-297. doi: 10.13390/j.issn.1672-1861.2016.04.003.

Abstract

OBJECTIVES:

This prospective study aimed to assess the curative efficacy and feasibility of fractional CO₂ laser in the treatment of vulvo-vaginal atrophy (VVA) in postmenopausal women.

METHODS:

30 patients with VVA recruited in this study, fractional CO₂ laser treatment was applied, visual analogue scale (VAS) and vaginal health index score (VHIS) measures were used to assess VVA, and degree of pain before and after the treatment, additionally, satisfaction survey was done post treatment.

RESULTS:

Fractional CO₂ laser treatment was significant improved VVA symptoms (vaginal itching, 6.00±2.60 vs. 1.38±0.97, P<0.001; vaginal dryness 7.04±2.26 vs. 1.88±1.03, P<0.001; vaginal burning, 6.25±2.13 vs. 1.50±0.88, P<0.001; dyspareunia, 7.54±2.54 vs. 2.04±1.15, P<0.001), as well as the VHIS (9.79±2.76 vs. 16.33±2.06, P<0.001). Satisfaction with the laser procedure was reported by 28 women (93.33%) and a minimal discomfort was experienced at the laser application. No adverse events were recorded.

CONCLUSIONS:

The fractional CO₂ laser treatment can improve the VVA symptoms in postmenopausal patients with vulvo-vaginal atrophy and was proved to be a simple, outpatient therapy for VVA patients.

The application of fractional CO₂ laser in the treatment of vulvar lichen sclerosis

Li J., Miao Y., Wang J. Chin J *Clin Obstet Gynecol.* 2016 July; 17(4): 298-301. doi: 10.13390/j.issn.1672-1861.2016.04.004.

Abstract

OBJECTIVES:

To investigate the efficacy and side effects for fractional CO₂ laser in the treatment of vulvar lichen sclerosis (VLS).

METHODS:

31 patients with VLS symptoms were enrolled prospectively from July 2015 to April 2016 in Peking University People's Hospital. The fractional CO₂ laser was used for VLS lesions, a total of 3-5 times, each time per-month. Visual analogue scale (VAS) was assessed the degree of vulvar pruritus, skin chapping, dyspareunia before and after treatment. After the treatment, satisfaction survey was done.

RESULTS:

The rate improvement of VLS symptoms was 90.32% (28/31) with fractional CO₂ laser (P<0.001). Compare with before treatment, there were significant difference in pruritus score at the first and the third after treatment one month (8.07±1.97 vs. 3.43±0.94 and 1.93±0.62, P<0.001), vulvar skin chapping score (3.5±1.79 vs. 1.36±1.22 and 0.64±0.84, P<0.005), respectively. The dyspareunia score (4.29±2.70 vs. 1.14±0.95, P<0.05) were improved significantly at the third after treatment one month. After treatment 48h, there were 2 cases with mild pain, 6 cases with local mils hyperemia, 4 cases with mild swelling. No adverse events due to fractional CO₂ laser treatment occurred. During 3-7 months follow-up, 4 cases (12.9%) with the skin color from white to gray, 2 cases recovered sex from 6 cases. The overall satisfaction rate was 96.77% (30/31).

CONCLUSIONS:

The fractional CO₂ laser is effective, minimal injury and acceptable side effects for vulvar lichen sclerosis, and may be a new treatment for it.

Microablative fractional CO₂-laser therapy and the genitourinary syndrome of menopause: An observational study

Pitsouni E., Grigoriadis T., Tsiveleka A., Zacharakis D., Salvatore S., Athanasiou, S. *Maturitas*. 2016 Dec. Vol. 94: 131-6. DOI: <http://dx.doi.org/10.1016/j.maturitas.2016.09.012>. Epub 2016 Sep 16.

Abstract

OBJECTIVES:

This study aimed to assess the effect of the Microablative Fractional CO₂ Laser (CO₂-laser) therapy on vaginal pathophysiology and the symptoms of the Genitourinary Syndrome of Menopause (GSM).

METHODS:

Postmenopausal women with moderate to severe symptoms of GSM underwent three sessions of CO₂-laser therapy at monthly intervals. Participants were evaluated at baseline and 4 weeks after the last treatment.

MAIN OUTCOME MEASURES:

The primary outcomes were Vaginal Maturation Value (VMV) and Vaginal Health Index Score (VHIS). Secondary outcomes included symptoms of GSM, Female Sexual Function Index (FSFI), International Consultation on Incontinence Questionnaire of Female Urinary Tract Symptoms (ICIQ-FLUTS) and Urinary Incontinence Short Form (ICIQ-UI SF), Urogenital Distress Inventory (UDI-6) and King's Health Questionnaire (KHQ).

RESULTS:

Fifty-three postmenopausal women completed this study. VMV, VHIS and FSFI increased significantly. Dyspareunia, dryness, burning, itching, dysuria, frequency, urgency, urgency incontinence, stress incontinence and scores on the ICIQ-FLUTS, ICIQ-UI SF, UDI-6 and KHQ decreased significantly. Factors predicting for which women the CO₂-laser therapy was more effective were not identified.

CONCLUSION:

This study suggests that intravaginal CO₂-laser therapy for postmenopausal women with clinical signs and symptoms of GSM may be effective in improving both vaginal pathophysiology and reported symptoms.



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Fractional CO₂ Laser Treatment of the Vestibule for Patients with Vestibulodynia and Genitourinary Syndrome of Menopause: A Pilot Study

Murina F., Karram M., Salvatore S., Felice R. *J Sex Med.* 2016 Dec. 13(12):1915-7. doi: 10.1016/j.jsxm.2016.10.006. Epub 2016 Nov 15.

Abstract

INTRODUCTION:

Chronic vulvar pain and burning remains one of the most perplexing problems faced by practicing gynecologists.

AIM:

To evaluate the effectiveness and safety of the application of micro-ablative fractional CO₂ laser to the vulvar vestibule in the management of patients with vulvar pain from vestibulodynia or genitourinary syndrome of menopause.

METHODS:

Patients (N = 70) underwent fractional micro-ablative CO₂ laser treatment for vestibular pain plus vestibulodynia (n = 37) or genitourinary syndrome of menopause (n = 33). Inclusion criteria were the existence of vestibular atrophic changes and the absence of moderate or severe pelvic floor hypertonic dysfunction.

MAIN OUTCOME MEASURES:

A visual analog scale of pain and the Marinoff score of dyspareunia were chosen to evaluate improvement. Grading of vestibular health also was quantified using a four-point scoring system (0 = no atrophy, 3 = severe atrophy). Data were collected at baseline, at weeks 4, 8, and 12, and 4 months after the final treatment.

RESULTS:

For visual analog scale and dyspareunia scoring and for the overall vestibular health index scoring, statistically significant improvement was noted after three sessions of vestibular fractional CO₂ laser treatment. Improvement gradually increased throughout the study period and was maintained through the 4-month follow-up visit. There was no statistically significant difference in outcomes between the two study groups. No adverse events from fractional CO₂ laser treatment were noted. Overall, 67.6% of patients stated significant improvement from the laser procedure.

CONCLUSION:

This preliminary case series showed encouraging results using fractional CO₂ laser treatment of the vestibule in women with vestibulodynia and genitourinary syndrome of menopause.



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Fractional CO₂ Laser Treatment for Vaginal Atrophy and Vulvar Lichen Sclerosus

Baggish M.S. *J Gynecol Surg.* 2016 Dec. 32(6): 309-17. doi:10.1089/gyn.2016.0099. Epub 2016 Nov 21.

Abstract

OBJECTIVES:

The aim of this research was to assess the efficacy of fractional CO₂ laser energy for treating vaginal atrophy and lichen sclerosus.

MATERIALS AND METHODS:

The first study population was 23 postmenopausal women diagnosed with vaginal atrophy via microscopic evaluation and who were symptomatic. The second study population was 27 postmenopausal women diagnosed with lichen sclerosus by biopsy and who were symptomatic. Patients with vaginal atrophy had 3 treatment sessions spaced at 4–6 weeks between each session. Laser settings for this group were: power: Watts, 30; time, 1000 microseconds; and spacing, 1000 micrometers. For the lichen sclerosus group, the power was set at 20 Watts and 3–4 treatments were given at 4–6-week intervals.

RESULTS:

In the vaginal atrophy cohort, 22/23 women who previously complained of dryness and discomfort had these symptoms alleviated and vaginal microscopic exam showed significant changes in color, elasticity, and wetness following 3 courses of CO₂ laser fractional treatment; additionally 20/23 women had elimination of urinary frequency and urgency, 18/21 women had alleviation of dyspareunia. In the lichen sclerosus cohort 24/27 patients who had laser treatment reported cessation of itching and pain/discomfort; and 26/27 women demonstrated visible improvement of skin color, elasticity, vascularity following 3-4 laser treatments. All examinations were performed with the operating microscope.

CONCLUSIONS:

The fractional CO₂ laser beam is useful for treating vaginal atrophy and lichen sclerosus. This new technique represents a significant divergence from estrogenic-, steroid- and corticosteroid-bulwark dependence. All treatments were performed in an office setting and were associated with either no pain or, at the most, minimal and temporary discomfort. This new use of the CO₂ laser is an excellent alternative for managing these two troublesome problems, particularly in postmenopausal women.



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Fractional CO₂ laser treatment: a novel approach for stress urinary incontinence management in post-menopausal women

González Isaza P., Ruiz Rosas A. I., Vélez Rizo D. L. *Urología Colombiana*. 2017; 26(1). DOI: 10.1016/j.uroco.2016.10.004. Epub 2016 Oct 09.

Abstract

OBJECTIVE:

To describe the results of the fractional CO₂ laser as an alternative treatment for stress urinary incontinence in post-menopausal women, and to demonstrate an improvement in quality of life after the treatment.

MATERIALS AND METHODS:

A prospective, single centre descriptive study was conducted on 10 post-menopausal patients with diagnosis of stress urinary incontinence. Recruited patients were evaluated with Stress Cough test and urethral Mobility Q-Tip Test, which confirmed the diagnosis. They then began a 3 session treatment protocol; 1 every 3 weeks using the SmartXide² V²LR fractional microablative CO₂ laser system for the MonaLisa TouchTM procedure in the urethrovesical junction. The Urogenital Distress Inventory UDI-6 was performed to evaluate severity and quality of life impact related to stress urinary incontinence in the patients included in the study, before and after treatment. Patients were monitored from July to December 2013.

RESULTS:

Analysis of the UDI-6 Scores before and at the end of treatment showed an improvement in the score in comparison to the baseline condition, indicating a subjective improvement in all the symptoms related to SUI included in the score.

CONCLUSIONS:

The MonaLisa TouchTM procedure performed with SmartXide² V²LR laser system is a complementary alternative to traditional surgical techniques, providing a safe and effective treatment for urinary incontinence in post-menopausal women.



The Code of Excellence

Fractional CO₂ Laser: From Skin Rejuvenation to Vulvo-Vaginal Reshaping

Filippini M., Del Duca E., Negosanti F., Bonciani D., Negosanti L., Sannino M., Cannarozzo G., Nisticò SP. *Photomed Laser Surg.* 2017; 35(x):x-xx. doi: 10.1089/pho.2016.4173. Epub 2016 Dec 30.

Abstract

BACKGROUND:

The CO₂ laser has become the gold standard treatment in dermatologic surgery for the treatment of a large number of skin and mucosal lesions. The introduction of the fractional micro-ablative technology represented an integration to the ablative resurfacing technique, reducing the healing time and the side effects.

OBJECTIVE:

Vaginal rejuvenation performed with this technique is a minimally invasive procedure that stimulates internal tissues of the female lower genital tract to regenerate the mucosa, improving tissue trophism and restoring the correct functionality.

METHODS:

In our experience, 386 menopausal women affected with vulvo-vaginal atrophy (VVA) were treated with three sessions of fractional micro-ablative CO₂ laser.

RESULTS:

After three treatments, patients reported a complete improvement of the symptoms (59.94% dryness, 56.26% burn, sensation, 48.75% dyspareunia, 56.37% itch, 73.15% soreness, and 48.79% vaginal introitus pain).

CONCLUSIONS:

Fractional micro-ablative CO₂ laser seems to reduce symptoms related to vaginal atrophy. The beneficial effects were reported just after the first session and confirmed 12 months after the last session.



The Code of Excellence

Use of a novel fractional CO₂ laser for the treatment of genitourinary syndrome of menopause: 1-year outcomes.

Sokol E.R., Karram M.M. *Menopause* 2017 Feb; doi: 10.1097/GME.0000000000000839. Epub 2017 Feb 06.

Abstract

OBJECTIVE:

To assess safety and efficacy of a fractional CO₂ laser therapy for the treatment of genitourinary syndrome of menopause (GSM) with follow-up to 1 year posttreatment.

METHODS:

Women presenting with GSM and meeting inclusion criterion were enrolled. Visual Analog Scales were used to grade vaginal pain, burning, itching, dryness, dyspareunia, and dysuria. Dilators were used to rate vaginal elasticity at baseline and at each follow-up visit. Before each treatment and at follow-up, Vaginal Health Index scoring and Female Sexual Function Index questionnaires were completed. Women received three vaginal laser treatments spaced 6 weeks apart. Participant satisfaction was measured on 5-point Likert scales (1=very dissatisfied, 5=very satisfied).

RESULTS:

Of 30 women (mean age 58.6±8.8 years), three were lost to follow-up at 3 months and six at 1 year. None were discontinued or withdrew due to an adverse event. Average improvement in Visual Analog Scale scores for all symptom categories was statistically significant at 3 months and remained so through 1 year, except dysuria. Differences between data at 3 months and 1 year were not statistically significant, indicating persistence of positive outcomes. Average overall improvement in pain was 1.9 (±3.4), burning 1.9 (±3.1), itching 1.4 (±1.9), dryness 5.9 (±2.8), dyspareunia 4.9 (±3.3), and dysuria 0.9 (±3.1). Improvement in average Vaginal Health Index and Female Sexual Function Index scores was also statistically significant (P<0.0001). Of 19 women undergoing dilator examination at 1 year, 18 (94.8%) were comfortable with the same or larger dilator size. Twenty-two of 24 women (92%) were satisfied or extremely satisfied with the treatment at 1 year.

CONCLUSIONS:

Based on study data up to 1 year, the fractional CO₂ laser may be an effective and safe treatment for women suffering from symptoms of GSM, although additional studies with larger populations and placebo control is needed to confirm these results.



The Code of Excellence

[An Assessment of the Safety and Efficacy of the SmartXide² V²LR CO₂ Laser for the Treatment of Vulvovaginal Atrophy.](#)

Sokol E.R, Karram M. Poster presented at NAMS - Annual Meeting, Las Vegas 2015.

[Microablative Fractional CO₂ Laser for Vulvovaginal Atrophy in Women With a History of Breast Cancer](#)

Leone Roberti Maggiore U., Parma M., Candiani M., Salvatore S. *Journal of Minimally Invasive Gynecology*. 2015 Nov–Dec; 22(6) Supplement: p. S100. doi:10.1016/j.jmig.2015.08.269.
[Abstracts of the 44th AAGL Global Congress of Minimally Invasive Gynecology]

[Comments on Singh et al.: Laser Vaginal Rejuvenation: not Ready for Prime Time.](#)

Leone Roberti Maggiore U., Candiani M., Salvatore S. *International Urogynecology Journal*. 2015 May; 26(5):783. doi: 10.1007/s00192-015-2644-6. Epub 2015 Mar 27.

[Treatment of Coexistent Lichen Sclerosus and Vulvo-Vaginal Atrophy with Fractional CO₂ Laser Therapy.](#)

Dell J. *Lasers Surg. Med.* 2016 April; 48(4):433 #LB39. doi: 10.1002/lsm.22526.
[Late-breaking abstracts for the 36th ASLMS annual conference]

[An Assessment of the Safety and Fractional CO₂ Laser for the Treatment of Vulvovaginal Atrophy.](#)

Lang P., Hussain S., Karram M. *Lasers Surg. Med.* 2016 April; 48(4):433 #LB40. doi: 10.1002/lsm.22526.
[Late-breaking abstracts for the 36th ASLMS annual conference]

[Effects of fractional microablative CO₂ laser therapy on sexual function in postmenopausal women and women with a history of breast cancer treated with endocrine therapy.](#)

Gittens, P., Mullen, G.
[Poster presented at the International Society for the Study of Women's Sexual Health (ISSWSH) - Annual Meeting, Atlanta 2017. Also accepted as oral communication at American Urological Association (AUA) - Annual Meeting, Boston 2017].