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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., Bainsi I., Ferrero S., Origoni M., Zerbinati 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.



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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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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.



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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 neoformation 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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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.0000000000000230.

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.

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.



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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 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 mild 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.

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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[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; 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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[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.



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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.

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.



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 section 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

Safety and long-term efficacy of fractional CO₂ laser treatment in women suffering from genitourinary syndrome of menopause.

Behnia-Willison F., Sarraf S., Miller J., Mohamadi B., Care A.S., Lam A., Willison N., Behnia L., Salvatore S. *Eur J Obstet Gynecol Reprod Biol.* June 2017; 213:39-44. doi: 10.1016/j.ejogrb.2017.03.036. Epub 2017 Apr 2.

Abstract

OBJECTIVE:

To evaluate the safety and long-term efficacy of fractional CO₂ laser treatment in reducing the severity of symptoms of genitourinary syndrome of menopause (GSM) in menopausal women.

STUDY DESIGN:

102 women presenting with symptomatic GSM were treated with the fractional CO₂ laser (MonaLisa Touch, DEKA) system across a series of treatments delivered at intervals of six or more weeks. The Australian Pelvic Floor Questionnaire was used to gather data on sexual function and side-effects at three time-points across the study period (prospective panel design study). Wilcoxon signed-rank tests were used to detect statistically and clinically significant changes in sexual function and side-effects occurring from pre- to post-treatment. The primary outcome of this study was an improvement of the symptoms of GSM. The secondary outcome included bladder function and prolapse symptoms.

RESULTS:

A total of 102 women suffering from moderate to severe GSM were recruited. Eighty-four percent experienced significant improvement in their symptoms after CO₂ laser treatment. Scores on measures of sexual function, dyspareunia, and bothersomeness of sexual issues were improved from pre-treatment to long-term (12–24 month) follow-up. Furthermore, there were improvements on measures of bladder function (P = 0.001), prolapse (P = 0.001), vaginal sensation (P = 0.001), vaginal lubrication (P < 0.001) and urge incontinence (P = 0.003) from the pre-treatment assessment to the second assessment (i.e. after the third treatment).

CONCLUSIONS:

In this study, fractional microablative CO₂ laser treatment was associated with an improvement in symptoms of GSM and sexual function.



The Code of Excellence

Fractional CO₂ laser therapy: a new challenge for vulvovaginal atrophy in postmenopausal women.

Siliquini G.P., Tuninetti V., Bounous V.E., Bert F., Biglia N. *Climacteric*. 2017 May 15. doi: 10.1080/13697137.2017.1319815. Epub ahead of print.

Abstract

OBJECTIVE:

To evaluate the effects of CO₂ laser in the treatment of vulvovaginal atrophy (VVA) in postmenopausal women.

METHODS:

VVA was assessed in 87 postmenopausal women (mean age 58.6 ± 6.9 years) before and after the treatment. The protocol consisted of three monthly treatments and included the treatment of vulva. Subjective measures included VAS (Visual Analog Scale) both for vaginal dryness and dyspareunia; DIVA (Day-by-day Impact of Vaginal Aging); a questionnaire on treatment satisfaction and one about the degree of pain during the procedure. Objective measures included VHI (Vaginal Health Index) and VVHI (Vulvo-Vaginal Health Index). Time points of the study were at the screening visit (T0), at baseline (T1), at week 4 (T2), at week 8 (T3), after 3 months since the last laser application (T4), after 6 months (T5), after 9 months (T6), after 12 months (T7) and after 15 months (T8).

RESULTS:

Treatment induced significant improvement in the VAS score. After treatment, VHI and VVHI indicated no VVA and this improvement was long lasting. Multivariate analysis showed that the time of follow-up was correlated with better VHI and VVHI ($p < 0.001$). DIVA improved over time ($p < 0.001$).

CONCLUSIONS:

This study shows that CO₂ laser treatment induces a significant and long-lasting improvement of symptoms.



The Code of Excellence

[Long-term effect of thermoablative fractional CO₂ laser treatment as a novel approach to urinary incontinence management in women with genitourinary syndrome of menopause.](#)

González Isaza P., Jaguszewska K., Cardona J.L., Lukaszuk M. *Int Urogynecol J.* 2017 May 18. doi: 10.1007/s00192-017-3352-1. Epub ahead of print.

Abstract

INTRODUCTION AND HYPOTESIS:

The aim of this study was to evaluate the long-term effect of thermoablative fractional CO₂ laser (TACO2L) as an alternative treatment for early stages of stress urinary incontinence (SUI) in postmenopausal women with genitourinary syndrome of menopause.

METHODS:

A total of 161 postmenopausal patients (age 53.38 ± 5.1 years, range 45–65 years) with a clinical diagnosis of mild SUI were prospectively enrolled in the study. Patients received one treatment with TACO2L every 30–45 days, each treatment comprising four sessions, followed in all patients by a yearly treatment session at 12, 24 and 36 months. SUI was evaluated using the International Continence Society 1-h pad test and the International Consultation on Incontinence Questionnaire-Urinary Incontinence Short Form (ICIQ-UI SF) before and after TACO2L treatment.

RESULTS:

TACO2L treatment was associated with a significant improvement in ICIQ-UI SF scores and 1-h pad weight test at 12 months (both $p < 0.001$), 24 months (both $p < 0.001$) and 36 months (both $p < 0.001$). Improvements were maintained for up to 36 months without the need for any further intervention. The results were confirmed by significant histological changes related to trophic restoration of the vagina, responsible for extrinsic and intrinsic mechanisms involved in urinary continence.

CONCLUSIONS:

Our results suggest that TACO2L is an efficient and safe novel treatment strategy in patients with mild SUI. Further investigation to confirm the long-term results presented here is still warranted.

[Laser therapy for the genitourinary syndrome of menopause. A systematic review and meta-analysis.](#)

Pitsouni E., Grigoriadis T., Falagas M. E., Salvatore S., Athanasiou S. Maturitas. 2017 June 27. doi: <http://dx.doi.org/10.1016/j.maturitas.2017.06.029>.

Abstract

This study aimed to identify and then synthesize all available data regarding the efficacy of laser therapy for postmenopausal women with genitourinary syndrome of menopause (GSM) with/without urinary incontinence (UI). PubMed, Scopus, Web of Science, Cochrane Library and ClinicalTrials.gov were searched in October 2016. The keywords were “laser genitourinary syndrome of menopause”, “laser vulvovaginal atrophy”, “laser vaginal atrophy” and “laser women incontinence”. Quality of reporting and risk of bias of the included studies were assessed according to STROBE and MINORs checklists, respectively. Quality of the body of evidence was evaluated with the GRADE approach. Fourteen studies involving 542 participants were included in this systematic review and meta-analysis. All GSM symptoms (dryness/dyspareunia/itching/burning/dysuria/urgency/frequency) and UI decreased significantly and consistently in all available publications. The pooled mean differences for the various symptoms were: dryness $-5.5(95\%CI:-6.7,-4.4;7\text{studies};I^2:0\%)$, dyspareunia $-5.6(95\%CI:-6.8,-4.5;7\text{studies};I^2:0\%)$, itching $-4(95\%CI:-5.7,-2.2;6\text{studies};I^2:79\%)$, burning $-3.9(95\%CI:-5.9,-2;6\text{studies};I^2:87\%)$, dysuria $-2.9(95\%CI:-5.1,-0.7;4\text{studies};I^2:90\%)$ and UI $-4.9(95\%CI:-6.4,-3.4;2\text{studies};I^2:0\%)$. Because urgency/frequency was assessed by different methodologies the data could not be meta-analyzed. Furthermore, KHQ, UDI-6, MCS12/PCS12, FSFI, overall sexual satisfaction and measurements of the effect of laser therapy on the local pathophysiology improved significantly. In conclusion, laser therapy for postmenopausal women with GSM appears promising. It may reduce symptom severity, improve quality of life of postmenopausal women and restore the vaginal mucosa to premenopausal status. However, the quality of the body of evidence is “low” or “very low” and, thus, evidence-based modification of current clinical practice cannot be suggested.



The Code of Excellence

[CO₂-laser for the genitourinary syndrome of menopause. How many laser sessions?](#)

Athanasίου S., Pitsouni E., Falagas M.E., Salvatore S., Grigoriadis T. *Maturitas*. 2017 Oct; 104:24-8. doi: <http://dx.doi.org/10.1016/j.maturitas.2017.07.007>. Epub 2017 Jul 21.

Abstract

OBJECTIVE:

The aim of this prospective study was to assess the efficacy of 3, 4 or 5 CO₂-laser sessions for the management of the genitourinary syndrome of menopause (GSM).

METHODS:

Postmenopausal women with moderate to severe symptoms of dyspareunia, wanting to resume/retain sexual activity, were treated with 3–5 laser sessions depending on symptom severity/presence, sexual function, clinical findings and women's preference following the third laser application.

MAIN OUTCOMES:

Severity of dyspareunia, dryness, sexual function, sexual satisfaction and frequency of sexual intercourse defined the primary outcomes. Vaginal Maturation Value (VMV) and Vaginal Health Index Score (VHIS) defined the secondary ones.

RESULTS:

Fifty-five women received three sessions, 53 an extra fourth and 22 an extra fifth. Following the third, fourth and fifth laser sessions, respectively: dyspareunia completely regressed in 15/55 (27%), 32/55 (58%) and 38/47 (81%) of participants; dryness completely regressed in 20/55 (36%), 36/55 (66%) and 44/51 (86%); normal sexual function resumed in 23/55 (41%), 37/54 (69%) and 41/49 (84%); VMV regained non-atrophic values in 29/55 (53%), 38/55 (69%) and 42/50 (84%); and VHIS regained non-atrophic values in 44/55 (80%), 53/55 (96%) and 55/55 (100%) of participants.

CONCLUSIONS:

Results of this study indicate that CO₂-laser therapy may contribute to complete regression of dyspareunia and dryness and reestablishment of normal sexual function in postmenopausal women, in a dose-response manner. An extra fourth or fifth session may further increase the GSM symptom-free rate.



The Code of Excellence

Lasers for pelvic floor dysfunctions: is there evidence?

Lang P., Karram M. *Curr Opin Obstet Gynecol.* 2017 Jul 29. doi: 10.1097/GCO.0000000000000399. Epub ahead of print.

Abstract

PURPOSE OF REVIEW:

The purpose of this review is to discuss the available energy sources used in the vaginal canal that are currently being promoted for certain pelvic floor conditions and explore the body of peer-reviewed literature supporting their use.

RECENT FINDINGS:

The majority of research has focused on the use of fractional CO₂ laser treatment for genitourinary syndrome of menopause (GSM). Most of these studies are nonrandomized prospective studies, but their data consistently shows an improvement in symptoms without significant side effects.

SUMMARY:

Vaginal laser treatment for GSM is of particular interest to gynecologists as it provides patients with a history of estrogen receptor positive breast cancer, thromboembolic event, or other contraindication to hormone therapy, an effective treatment option. Currently, we are in the early stages of scientific investigation into the use of lasers in the treatment of pelvic floor dysfunction, but the emerging data is encouraging. The existing data is limited to mostly observational studies with additional quality randomized controlled trials and sham studies needed to ensure that physicians are providing the optimum evidence-based treatments to their patients. At the present time there is insufficient data to promote these therapies for stress incontinence, vaginal tightening, or other pelvic floor abnormalities.



The Code of Excellence

[Randomized, double-blind, placebo-controlled clinical trial for evaluating the efficacy of fractional CO₂ laser compared with topical estriol in the treatment of vaginal atrophy in postmenopausal women.](#)

Cruz VL, Steiner ML, Pompei LM, Strufaldi R, Fonseca FLA, Santiago LHS, Wajsfeld T, Fernandes CE. DOI: 10.1097/GME.0000000000000955

Abstract

OBJECTIVE:

The aim of the study was to evaluate efficacy of fractional CO₂ vaginal laser treatment (Laser, L) and compare it to local estrogen therapy (Estriol, E) and the combination of both treatments (Laser + Estriol, LE) in the treatment of vulvovaginal atrophy (VVA).

METHODS:

A total of 45 postmenopausal women meeting inclusion criteria were randomized in L, E, or LE groups. Assessments at baseline, 8 and 20 weeks, were conducted using Vaginal Health Index (VHI), Visual Analog Scale for VVA symptoms (dyspareunia, dryness, and burning), Female Sexual Function Index, and maturation value (MV) of Meisels.

RESULTS:

Forty-five women were included and 3 women were lost to follow-up. VHI average score was significantly higher at weeks 8 and 20 in all study arms. At week 20, the LE arm also showed incremental improvement of VHI score (P=0.01). L and LE groups showed a significant improvement of dyspareunia, burning, and dryness, and the E arm only of dryness (P<0.001). LE group presented significant improvement of total Female Sex Function Index (FSFI) score (P=0.02) and individual domains of pain, desire, and lubrication. In contrast, the L group showed significant worsening of pain domain in FSFI (P=0.04), but FSFI total scores were comparable in all treatment arms at week 20.

CONCLUSIONS:

CO₂ vaginal laser alone or in combination with topical estriol is a good treatment option for VVA symptoms. Sexual-related pain with vaginal laser treatment might be of concern.



The Code of Excellence

Microablative fractional CO₂ laser for the genitourinary syndrome of menopause: power of 30 or 40 W?

Pitsouni E, Grigoriadis T, Falagas M, Tsiveleka A, Salvatore S, Athanasiou S. DOI: 10.1007/s10103-017-2293-8

Abstract

This retrospective case-control study aimed to compare 30 versus 40 W power of CO₂ laser for the therapy of genitourinary syndrome of menopause (GSM). Postmenopausal women with severe intensity of dyspareunia and dryness were eligible to be included in this study. Primary outcomes were dyspareunia and dryness. Secondary outcomes were itching/burning, dysuria, frequency and urgency, Female Sexual Function Index (FSFI), vaginal maturation value (VMV), and Vaginal Health Index Score (VHIS). One laser therapy was applied every month for 3 months. Outcomes were evaluated at baseline and 1 month following the 3rd therapy. Fifty (25 per group) women were included in this study. In the 30-W group, mean improvement of dyspareunia, dryness, itching/burning, FSFI, VMV, and VHIS was 6.1 ± 1.7 , 6.0 ± 1.9 , 5.9 ± 2.0 , 16.6 ± 6.7 , 29.9 ± 13.0 , and 11.0 ± 2.9 , respectively (within group comparisons all $p < 0.001$). In the 40-W group, mean improvement of dyspareunia, dryness, itching/burning, FSFI, VMV, and VHIS was 6.1 ± 1.7 , 6.5 ± 2.0 , 5.2 ± 2.5 , 14.8 ± 7.1 , 25.0 ± 13.4 , and 10.5 ± 4.1 , respectively (within-group comparisons, all $p \leq 0.001$). Comparison between 30 and 40 W revealed that mean improvement or presence of all GSM symptoms and clinical signs was not statistically significant different. CO₂ laser therapy may improve GSM symptoms and clinical signs. This improvement did not seem to associate to power of 30 or 40 W.

[Sexual function in women suffering from genitourinary syndrome of menopause treated with fractionated CO2 laser.](#)

Salvatore S., Pitsouni E., Del Deo F., Parma M., Athanasiou S., Candiani M. *Sex Med Rev.* 2017 Aug 23. pii: S2050-0521(17)30073-2. doi: 10.1016/j.sxmr.2017.07.003. Epub ahead of print.

Abstract

INTRODUCTION:

Genitourinary syndrome of menopause (GSM) has a significant impact on the trophism of the genital and lower urinary tracts and can considerably impair sexual function. Fractional CO2 laser has a regenerative effect on vulvovaginal tissue trophism after menopause.

AIM:

To review the available literature on the effect of fractional CO2 laser on the sexual function of postmenopausal women affected by GSM.

METHODS:

A database search was carried out using the terms CO2laser, vaginal atrophy, sexual function, dyspareunia, and genitourinary syndrome of menopause and excluding studies using other types of laser or including breast cancer survivors with vulvovaginal atrophy. For statistical analysis, the estimated overall laser effect was computed (when at least two studies were involved) and data type of generic inverse variance was computed using inverse variance as the statistical method, a random-effects model, and the difference in means as an effect measurement.

MAIN OUTCOME MEASURES:

Different methods of evaluating sexual function were reported and studies were grouped and analyzed accordingly. Subjective assessment for dyspareunia was evaluated with a 10-point visual analog scale. Patient-reported outcome for an overall perception of sexual function was evaluated with a Likert scale. The Female Sexual Function Index was used as a condition-specific questionnaire.

RESULTS:

Six articles were considered for this review. A total of 273 women (mean age = 57.8 years) were treated with the same protocol in all studies. Compared with baseline, at the end of the treatment, dyspareunia significantly decreased in severity ($P < .001$), and the patient's perception of overall sexual function showed a statistically significant improvement ($P < .001$). At the last follow-up visit, the Female Sexual Function Index score for each single domain and overall score was significantly better than at entry ($P < .001$).

CONCLUSION:

Fractional CO2 laser can improve sexual function in postmenopausal women affected by GSM by restoring a better trophism in the lower genitourinary tract. Salvatore S, Pitsouni E, Del Deo F, et al. Sexual Function in Women Suffering From Genitourinary Syndrome of Menopause Treated With Fractionated CO2Laser. *Sex Med Rev* 2017;X:XXX-XXX.



The Code of Excellence

Long-term reliability of fractioned CO2 laser as a treatment for vulvovaginal atrophy (VVA) symptoms.

Pieralli A., Bianchi C., Longinotti M., Corioni S., Auzzi N., Becorpi A., Fallani M.G., Cariti G., Petraglia F. *Arch Gynecol Obstet.* 2017 Sep 2. doi: 10.1007/s00404-017-4504-8. Epub ahead of print.

Abstract

PURPOSE:

The aim of this study was to evaluate long-term effects of the fractional CO2 laser for the treatment of vulvovaginal atrophy (VVA) symptoms.

METHODS:

Women presenting with VVA symptoms and meeting inclusion criterion were enrolled to fractioned CO2 laser therapy. Patient's satisfaction was measured on five-point Likert scale at 4 weeks and 6, 12, 18, 24 months after treatment by interview and clinical examination for vaginal livability.

RESULTS:

184 patients constituted the final study group: 128 women were spontaneous menopause and 56 were oncological menopause. 117 women were nulliparous and 36 had previous hysterectomy. 95.4% (172/184) of the patients declared that they were satisfied or very satisfied with the procedure at 4 weeks after treatment. At 6 months 92% (170/184) patients were satisfied; at 12 months 72% (118/162) were satisfied; at 18 months 63% (60/94) were satisfied; at 24 months 25% (4/16) of patients answered they were still satisfied. We observed a decline in patient's satisfaction between 18 and 24 months after laser therapy. Data showed that the time interval from onset of menopause was a statistically significant factor ($p < 0.05$) for treatment satisfaction in oncological group.

CONCLUSION:

Long-term data showed that the improvement of vaginal health may continue up to 24 months after fractional CO2 laser treatment although between 18 and 24 months benefits decline, and approximately 80% of women decide to start a new treatment cycle of laser applications.



The Code of Excellence

Fractional CO₂ laser of the vagina for genitourinary syndrome of menopause: Is the out-of-pocket cost worth the outcome of treatment?

Lang P., Dell J.R., Rosen L., Weiss P., Karram M. *Lasers Surg Med.* 2017 Sep 7. doi: 10.1002/lsm.22713. Epub ahead of print.

Abstract

OBJECTIVES:

The purpose of this study is to assess patient's satisfaction treatment outcomes and out-of-pocket expense for the fractional CO₂ laser (SmartXide) in the treatment of genitourinary symptoms of menopause (GSM).

MATERIALS AND METHODS:

A multicenter retrospective cohort study of patients who completed a course of three vaginal treatments with the SmartXide Fractional CO₂ laser. Patients contacted via telephone and asked to participate in questionnaires to evaluate for adverse outcomes since last treatment, symptom severity before and after treatment, patient satisfaction with treatment, patient satisfaction with out-of-pocket expense, and sexual function.

RESULTS:

Of the 368 patients contacted, 122 agreed to be interviewed. No patients reported seeking emergent medical treatment. Patient reported vaginal dryness significantly improved following treatment ($P < 0.05$). The frequency of intercourse increased from "once a month" to "few times a month" ($P < 0.001$). The vast majority of patients reported being satisfied with their treatment results (86%) and with the cost of treatment (78%). Satisfaction with the out-of-pocket expense did not correlate with household income ($P = 0.07$).

CONCLUSION:

The SmartXide Fractional CO₂ laser is a safe and efficacious treatment for GSM. This treatment is associated with a high level of patient satisfaction with both treatment results and out-of-pocket expense.



The Code of Excellence

[The 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 P1, Mullen G2. J Cosmet Laser Ther. 2018 Jun 8:1-5. doi: 10.1080/14764172.2018.1481510

Abstract

PURPOSE:

To examine the outcomes of sexual function in postmenopausal women and women with a history of breast cancer treated with endocrine therapy who were experiencing the symptoms of GSM for which they were treated with fractional microablative CO₂ laser.

MATERIALS AND METHODS:

From July 2015 to October 2016, a retrospective chart review of women who underwent fractional microablative CO₂ laser therapy (MonaLisa Touch, DEKA) for GSM was conducted. Several validated questionnaires were used to assess changes in symptoms and sexual function including the Female Sexual Function Index (FSFI), the Wong-Baker Faces Scale (WBFS), and the Female Sexual Distress Scale-Revised (FSDSR). Comparisons of mean symptom scores were described at baseline and six weeks after each treatment.

RESULTS:

There was a statistically significant improvement in every domain of FSFI, WBFS, and FSDS-R when comparing baseline symptom scores to after treatment three symptom scores for all patients. The secondary outcome was to evaluate the differences, if any, in outcomes of sexual function between postmenopausal women and women with a history of breast cancer treated with endocrine therapy. Both groups had statistically significant improvements in many domains studied.

CONCLUSIONS:

Fractional microablative CO₂ laser therapy (MonaLisa Touch, DEKA) is an effective modality in treating the symptoms of GSM in postmenopausal women and women with a history of breast cancer treated with endocrine therapy.



The Code of Excellence

Comments:

[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.

Meetings & Congresses:

[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]

[Treatment of Coexistent Lichen Sclerosus and Vulvo-Vaginal Atropgy 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]

[Is it all just smoke and mirrors?: Vaginal laser therapy and its assessment by tactile imaging](#)

van Raalte H., Bhatia N., Egorov V.
[Poster presented at the International Urogynecological Association (IUGA) - 41th Annual Meeting, Cape Town, South Africa, 2016]

[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]

[Fractional CO₂ laser effect on thick connective tissue of the vaginal wall of women with anterior vaginal prolapse: an ex-vivo study.](#)

Salvatore S., Virgilio S., Palmieri S. Girardelli S., Redaelli A., Parma M., Candiani M., Calligaro A.



The Code of Excellence

European Journal of Obstetrics and Gynecology and Reproductive Biology. 2017 April; Vol. 211:207–8 #18.

Doi: <http://dx.doi.org/10.1016/j.ejogrb.2017.01.044>.

[Oral Abstracts, 9th EUGA Annual Congress – Amsterdam 2016]

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. *The Journal Of Urology*. 2017 April; Vol. 197, No. 4S, Supplement, Page e883. Doi: <https://doi.org/10.1016/j.juro.2017.02.2065>

[Oral communication, AUA 2017 – Annual Meeting, Boston, MA, USA and also presented as poster at the ISSWSH 2017 - Annual Meeting, Atlanta, GA, USA]

Improvement in female sexual function using CO₂ laser therapy.

Sophocles M., Sadiq F. *The Journal of Sexual Medicine*. 2017 May. Volume 14, Issue 5, Supplement 4, 2017, e253-e254

[23rd Congress of the World Association for Sexual Health 2017 - Prague, Czech Republic]

Improvement in female sexual function using CO₂ laser therapy.

Sophocles M. *The Journal of Sexual Medicine*. 2017 June. Volume 14, Issue 6, Supplement 5, e362-e363, #035. Doi: <https://doi.org/10.1016/j.jsxm.2017.04.039>

[Proceedings of the ISSWSH 2017 - Annual Meeting, Atlanta, GA, USA]

Vaginal microbiota in postmenopausal women treated with pulsed CO₂ laser for genitourinary syndrome of menopause (GSM).

Salvatore S., Verri ., Girardelli S., Iachini E., Mancini N., Marotta E., Candiani M. *Maturitas*. 2017 June.

Volume 100, p:198 #P159. DOI: <https://doi.org/10.1016/j.maturitas.2017.03.259>.

[11th Congress of EMAS 2017 - Amsterdam, Netherlands]

The 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.

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