

PUBLICATIONS IN SCIENTIFIC JOURNALS UP TO 2021 CONTINUE TO PROVIDE EVIDENCE OF POSITIVE OUTCOMES.

Importantly, the studies include Cochrane reviews (a British organisation that organises medical research findings to facilitate evidence-based choices about health interventions), a number of randomized trials comparing the treatment with topical oestrogen therapy and sham treatments, and most of the studies are prospective (a better quality of study than retrospective).

Treatment to External Labia and Vaginal Canal With CO₂ Laser for Symptoms of Vulvovaginal Atrophy in Postmenopausal Women. Julene B Samuels, Martin A Garcia

Aesthet Surg J 2019 Jan 1;39(1):83-93.doi: 10.1093/asj/sjy087

Forty postmenopausal women were treated extravaginally and internally with a fractional CO₂ laser. Objective measurements of vaginal health index, as well as subjective measurements of symptoms of vulvovaginal atrophy (VVA), urinary incontinence, and sexual function were reported at baseline. Follow-up evaluations were at one, three, six, and 12 months after the third treatment.

Vaginal health index improved significantly after the first treatment and was maintained with mean improvement of 9.6 ± 3.3 ($P < 0.001$) and 9.5 ± 3.3 ($P < 0.001$) at the 6- and 12-month follow ups, respectively. Vaginal symptoms of dryness, itching, and dyspareunia improved significantly ($P < 0.05$) at all evaluations. Histological findings showed increased collagen and elastin staining, as well as a thicker epithelium with an increased number of cell layers and a better degree of surface maturation.

They concluded 'Fractional CO₂ laser treatments were well tolerated and were associated with improvement in vaginal health and amelioration of symptoms of VVA. Histological changes in the epithelium and lamina propria, caused by fractional CO₂ laser treatments, correlated with clinical restoration of vaginal hydration and pH to premenopausal levels.'

Because the authors presented pathology biopsies (objective outcomes) that correlated with clinical improvement (subjective outcomes) this study is of scientific value.

Efficacy of fractional CO₂ laser treatment in postmenopausal women with genitourinary syndrome: a multicenter. Maurizio Filippini et al.

Menopause. 2020 Jan;27(1):43-49. doi: 10.1097/GME.0000000000001428.

Fractional CO₂ laser system (SmartXide VLR, Deka m.e.l.a., Florence, Italy) in Six hundred forty-five women who met the inclusion criteria were considered. The pre- and post-treatment averages of the symptoms, the standard deviation, and the P values were calculated. In all the parameters examined (dyspareunia, vaginal orifice pain, dryness/atrophy, itching, burning, pH) statistically significant data were found between the pretreatment and the post-treatment (dryness: before = 8.30, after = 2.97 [$P < 0.0001$], dyspareunia: before = 8.70, after = 3.51 [$P < 0.0001$]; burning: before = 6.12, after = 1.78 [$P < 0.0001$]; vaginal orifice pain: before = 8.07, after = 2.94 [$P < 0.0001$]; itching: before = 6.09, after = 1.32 [$P < 0.0001$]).

They concluded 'effectiveness and a good degree of tolerance of treatment'.

This study has the benefit of a large number of women, however it was a retrospective observational study which has some scientific limitations compared with any prospective study.

Effect of the Fractional CO₂ Laser on the Quality of Life, General Health, and Genitourinary Symptoms in Postmenopausal Women With Vaginal Atrophy: A Prospective Cohort. Khadijeh Adabi et al.

J Lasers Med Sci. Winter 2020;11(1):65-69.
doi: 10.15171/jlms.2020.11. Epub 2020 Jan 18.

This prospective study was conducted among 140 women from 2017 to 2018, having in CO₂ laser system three times at four-week intervals. The short form of the Health Questionnaire (SF-12) and the Female Sexual Functional Index (FSFI) questionnaire, the vaginal health index (VHI) and International Consultation on Incontinence Questionnaire (ICIQ) Form were used to evaluate the quality of life. It improved significantly in somatic, social function, and mental health. In the sexual context, arousal and satisfaction status improved significantly. Also, the frequency of urinary incontinence, enuresis, urgency, and the leak improved significantly ($P < 0.05$). Among the scale variables for urinary function, it was seen that the urgency impact had no improvement. All vaginal indices improved ($P < 0.05$).

They concluded 'fractional CO₂ laser can be effective in treating vaginal atrophy and urinary symptoms'.

The study is observational and prospective; however a control arm would have been a useful addition to exclude any other confounding variables, *inter alia* a placebo effect or other scientific bias that is possible.

AUGS Clinical Consensus Statement. Ashliek et al

Female Pelvic Medicine & Reconstructive Surgery. Vol 26, Number 5, May 2020.

https://www.augs.org/assets/1/6/Vaginal_Energy_Based_Devices.3.pdf

This well researched article from the American Urogynaecology Society looks at **all** energy based vaginal devices (EBD), and acknowledge the significant differences between non-ablative devices, fractional CO₂ laser (eg Monalisa Touch smartxide DEKA), hybrid lasers, and the different category of radiofrequency devices. In total 28 statements reached consensus by the working parties; the 12 statements that did not reach consensus were a result of an absence of evidence.

Listed are some of the consensus statements.

EFFICACY: A statement that reached consensus is that 'EBD therapy has shown promise in treatment of VVA, vaginal dryness, and menopausal dyspareunia'. The statement concluded that 'overall most published articles are small, short case series that measure a variety of outcomes'.

TIMING: 'The AUGS EBD writing group reached consensus that the benefits of fractionated laser therapy to treat menopausal dyspareunia may last up to 1 year', and 'vaginal CO2 laser therapy has been shown to be effective in treatment of VVA in several studies up to 20 weeks'.

COST-EFFICACY DATA: 'There are no comparative cost-efficiency data for EBD therapy versus available medical and surgical therapies for GSM/VVA'.

OTHER THERAPIES: 'Pretreatment criteria for EBD therapy may include inability to use vaginal estrogen treatment for menopausal dyspareunia, VVA or vaginal dryness...But there are insufficient data to demonstrate the safety of vaginal oestrogen for women with breast cancer'.

SAFETY: All 6 drafted statements on the safety of vulvovaginal EBD therapy achieved consensus....the AUGS EBD writing group largely agreed that.. (these) therapies have a favorable safety profile', but 'the long-term sequelae of vulvovaginal EBD therapy are unknown'.

NAMS Position Statement. The 2020 genitourinary syndrome of menopause position statement of the North American Menopause Society. *Menopause* 27 (9). pp976-992

<https://www.menopause.org/docs/default-source/default-document-library/2020-gsm-ps.pdf>

This document contains some helpful data on treatment options **other than laser**, and stresses that 'there is insufficient data at present to confirm the safety of vaginal estrogen or DHEA in women with breast cancer'; recommends 'non-hormonal therapies for women with mild symptoms'; and calls for 'more placebo-controlled trials..of laser(therapies)'.

Treatment for vaginal atrophy using microablative fractional CO2 laser: a randomized double-blinded sham-controlled trial Purim Ruanphoo, Suvit Bunyavejchevin

Menopause. 2020 Aug;27(8):858-863. doi: 10.1097/GME.0000000000001542.

A total of 88 postmenopausal women with moderate to severe intensity of any vaginal atrophy symptoms (VAS) were invited to participate in the study. women were randomized to receive treatment with either vaginal CO2 laser or sham procedures every 4 weeks for three sessions. Both the participants and the evaluators were blinded to the treatment. Vaginal Health Index (VHI) score (primary outcome), VAS score, and the item for vaginal dryness from the International Consultation on Incontinence Modular Questionnaire-Vaginal Symptoms questionnaire were compared between the two groups by intention-to-treat analysis at 12 weeks after treatment. Of the 88 women, 9 women were lost to follow-up. After 12 weeks of laser treatment, the VHI, VAS, and International Consultation on Incontinence Modular Questionnaire-Vaginal Symptoms (item for vaginal dryness) scores were significantly improved. For VHI and VAS scores the mean difference between the laser

group versus the sham group was 1.37 (95% CI: 0.12-2.63), $P < 0.001$ and -1.52 (95% CI: -2.21 to -0.82), $P = 0.03$, respectively.

They concluded 'microablative fractional CO₂ laser was effective in treating vaginal atrophy. It could be a promising alternative treatment for postmenopausal women with vaginal atrophy'.

Effects of local laser treatment on vulvovaginal atrophy among women with breast cancer: a prospective study with long-term follow-up. Lucie Veron et al.

Breast Cancer Res Treat. 2021 Jul;188(2):501-509. doi: 10.1007/s10549-021-06226-3. Epub 2021 Apr 23.

Women with breast cancer (BC) often suffer from severe vulvovaginal atrophy (VVA). This prospective study among women with BC and VVA, evaluated the effect of fractional microablative CO₂ laser therapy once per month for 3 months. Efficacy of laser therapy was assessed at baseline, 6 months and 18 months after treatment, using Female Sexual Function Index (FSFI) score, and vaginal pH. A pap smear was also performed and the epithelial maturation pattern was noted. Paired statistical tests were used to compare results between baseline, 6 months and 18 months. Of the 46 women with BC (median age 56.5) years, the PH level slightly decreased over time (mean Δ at 18 months -0.3, SD = 0.7, $p = 0.02$) whereas maturation pattern on pap smear did not change. Sexual quality of life was significantly improved at 6 months and 18 months (mean Δ at 6 months 8.3, SD = 6.2 ($p < 0.0001$) and mean Δ at 18 months 4.3, SD = 8.4 ($p = 0.01$)).

They concluded 'women with BC, fractional microablative CO₂ laser is effective on the long term on VVA symptoms and gynaecological quality of life.'

Conflict of interest statement by the authors. The microablative laser was provided by DEKA. There was no financial support from DEKA.

Efficacy of CO₂ laser treatment in postmenopausal women with vulvovaginal atrophy: a meta-analysis. Liu et al.

Int J Gynaecol Obstet. 2021 Oct 8. doi: 10.1002/ijgo.13973.

PubMed, Embase, Cochrane Library and Web of Science were searched to June 9th, 2020. Prospective studies on the efficacy of CO₂ laser treatment were included. Twelve literatures including 459 participants were enrolled. Compared to baseline, VHIs were significantly higher at 1-, 3-, 6-, and 12-month follow-ups ($P < 0.001$). For VVA severity, VAS scores in vaginal dryness at 1-, 3-, 6-, and 12-month follow-ups ($P < 0.050$), in vaginal burning, itching and dysuria at 1-month follow-up ($P < 0.001$), and in dyspareunia at 1-, 3-, 6-, and 12-month follow-ups ($P < 0.001$) were all significantly lower. For FSFI, total scores at 1-, 3-, 6-, and 12-month follow-ups ($P < 0.001$), and the scores in desire, arousal, lubrication, orgasm, satisfaction, and pain at 1-month follow-up ($P < 0.050$) were all significantly higher. For QoL, PCS12 and MCS12 scores were all significantly higher ($P < 0.050$) at 1-month follow-up.

They concluded "CO₂ laser treatment may be effective for post-menopausal women with VVA symptoms in improving QoL and sexual function."