

Histological study on the effects of microablative fractional CO₂ laser on atrophic vaginal tissue: an ex vivo study

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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.