Low Level Laser Treatment (LLLT) for fibrosis; capsular contracture of post-mastectomy breast implants.

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Background: Cosmetic reconstruction of the breast can involve implantation of a prosthetic device. These implants undergo deformation in 10-50% of cases, due to contraction of a fibrotic capsule that develops around them, resulting in their removal if the contracture is bad (Grade III or IV). Recent work in the US has shown that capsular contracture in humans can be improved by LLLT, based on its efficacy in treating lymphoedema and fibrosis. We evaluated the effect of LLLT on fibrosis associated with implant capsules in an animal model.

Methods: Two silicone implants (provided by Mentor) were placed subcutaneously on the dorsum of mice and the implant site was irradiated (X-Rays, 10 gray) to induce fibrosis. The animals then received either LLLT or placebo 3 times per week for 3 weeks (n=5 in each group). Implants were imaged by microCT, and histological assessment of implant capsules was performed.

Results: There was no evidence of capsular contracture in either group. Capsules surrounding implants receiving LLLT were better organised histologically, with tight connective tissue layers parallel to the capsule surface, well aligned fibroblasts and moderate inflammatory cell infiltrate. Capsules receiving placebo treatment were less well organised, with more random connective tissue and fibroblast cell orientation, a greater degree of interstitial space and more inflammatory cell infiltrate.

Conclusions: Capsular contracture was not induced in this model. LLLT resulted in a more organised capsular structure, and less inflammatory reaction to the implant. These observations may be relevant to the efficacy of LLLT in lymphoedema.

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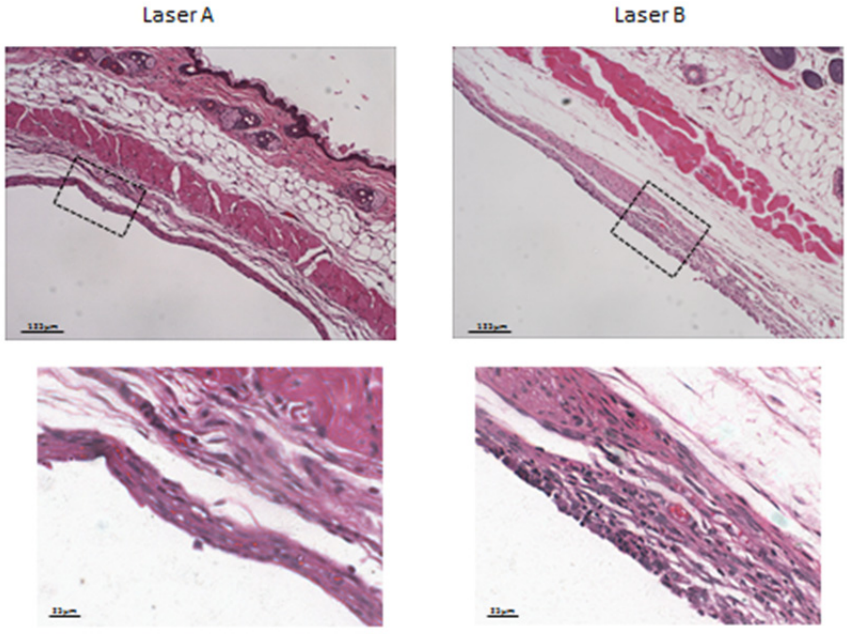

Pathology showing capsule thickness and organisation between Laser A (functioning) and Laser B (Placebo).

Treatment of Capsular Contracture with Low Level Laser Therapy

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Following is a summary of a presentation made by Dr Scarlett. Additional detail is available.

Protocol

Patients underwent laser treatments once a week for a period of six weeks. They received 10 minute treatment using the 904nm laser. This was a 2cm square grid pattern with one minute of treatment in each area. (300 mJ/ 1 min treatment = 4.5 Joules/cm2

Data Summary

- 23 patients, 8 of which had previous radiation
- Surgical intervention was avoided in 91.3% of patients with grade III/IV capsular contraction.
- Of the patients who avoided surgery, the laser improved the stiffness of the breast by 10-95% with an average of 50.2%.
- The overall improvement in comfort for these patients ranged from 10-95% with an average of 52.1%.

Conculsion

- LLLT is a promising alternative treatment for grades III & IV capsular contracture.
- In the majority of cases, both patients and surgeon observed significant tissue softening and improved breast contour after treatment with the LTU-904 laser.
- Factors to incorporate in subsequent studies to confirm validity of this pilot study: evaluation of current treatment protocol, randomized blinded study, larger patient population, objective measurement of the breast tissue changes and comparison to other non-invasive treatment methods.