Ultrastructural Evaluation Of Skin After Treatment With Combination Light & Bipolar Radiofrequency

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Background and Objective: Non-ablative rejuvination devices are systems that deliver energy to the dermis in order to promote dermal collagen production and tissue contraction. The gold standard treatment device employs a mono-polar radiofrequency electrode to induce a deep thermal injury to the skin. This study will examine the ultrastructural changes in collagen using a combination bipolar RF electrode in conjunction with an infrared diode laser. **Study Design/Materials and Methods:** One subject was consented and treated in the abdominal region with the Polaris WR device (Syneron Medical Ltd., Yokneam, Israel) using 1, 3 or 5 pulses at setting 32/90. Biopsies from each treatment region and a control biopsy were taken immediately post treatment for electron microscopic examination of the 0-1mm and 1-2mm levels. Sections of tissue 0.5mm x 0.5mm x 80nm were examined with an RCA EMU-4 Tranmission Electron Microscope. Samples from each 1 mm depth were examined by two blinded observers and the morphology and degree of collagen change as compared to the control tissue was documented.

Results: Ultrastructural examination of tissue showed increased amount of collagen fibril changes with increasing passes . The changes seen after single passes showed an accumulation of partially denatured collagen (Fig 1-2) Arrows. Five passes caused areas of collagen to become completely denatured (Fig 3) Arrows.

Conclusion: This ultrastructural study of the Polaris WR treated human skin shows changes in collagen fibril morphology with an increased effect demonstrated in the dermis with multiple passes. The thermal injury that result in the ultrastructural changes seen in the dermal layer appears to alter the architecture of the treated skin.

References

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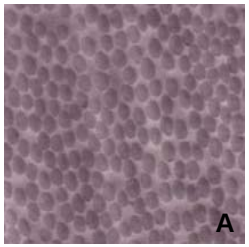
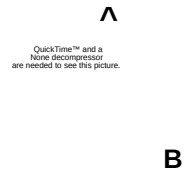




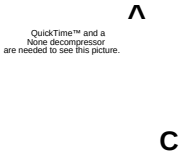
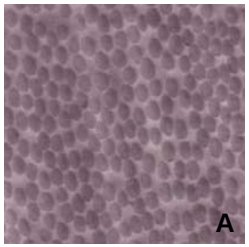
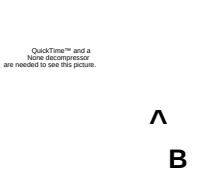


Figure 1. A. Control. **B. 32/90 x1 pass 0-1mm.** **C. 32/90 x1 pass 1-2mm.**





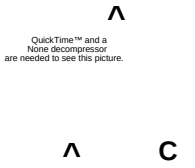
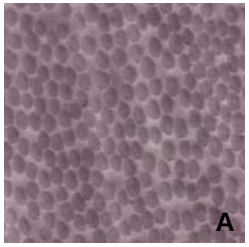
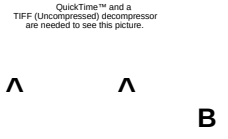


Figure 2. A. Control. **B. 32/90 x3 pass 0-1mm.** **C. 32/90 x3 pass 1-2mm.**





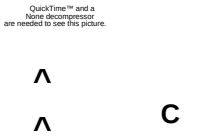


Figure 3. A. Control. **B. 32/90 x5 pass 0-1mm.** **C. 32/90 x5 pass 1-2mm.**