Ocular Surface temperature changes associated with Pelleve Radiofrequency Treatment

Scott M. Goldstein, MD


Provided for educational purposes
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Scott M. Goldstein, MD
Oculoplastic Surgery Service
Wills Eye Institute
Adjunct Clinical Asst Professor of Ophthalmology,
Thomas Jefferson University
Philadelphia, PA
• Gentle heating of the skin denatures & contracts collagen in the deep dermis & stimulates fibroblast activity/neocollagenesis
  – No injury in epidermis thus no downtime
How Much Heat is Required?

**Not Safe**
- Heating sufficient to cause complete collagen fiber dissolution (collagen turns into gelatin)
- Tissue necrosis, scarring, burning, etc.

**Safe, Effective**
- Heating partially disrupts semi crystalline fibril structure
- Weak intermolecular bonds maintain structural stability
- Contraction along the length of collagen fibers occurs
- Thermally mediated healing response causes new collagen formation

**Safe, Not Effective**
- Heating insufficient to disrupt collagen fibril structure
- No clinical effect observed
What Subdermal Temperature?

• 65°C is most commonly referenced temp for human collagen modification
• 63-67°C for sheepskin
• 54-59°C for intact rat tail tendon
• 61-63°C for human scleral collagen
• 55-59°C for human corneal collagen
• 65-75°C – Ulthera citation for human “connective tissue”
• 55-65°C – Thermage target temperature
• 55-65°C – Accent target temperature
Study

- Determine effects of lower lid & crows feet soft tissue heating on the globe
- 13 consecutive patients enrolled
- Baseline surface temperature of sclera/globe at point half way between limbus & inferior fornix
• Therapeutic treatment of soft tissue to obtain surface skin temperature of 39-42ºC,
• Temperature re-recorded on ocular surface at end of treatment
• Treatment alternated right and left for total of one treatment per decade of life to each side
  – 42 yo had each eye area treated 4 times
IR temperature measurement
Results

• Baseline temperature
  – Right: 35.43°C & Left: 34.45°C

• 13 patients, 58 passes
  – Average 4.54 treatment cycles/eyelid

• Post treatment inferior globe temperature
  – Right: 36.52°C & Left: 36.57°C

• No reported changes in vision
Conclusions

• Pelleve RF treatment of periocular rhytids has minimal energy transfer to globe with only 1.61°C change in surface temperature.
  – Measured temperature still well below internal body temperature and certainly well below temperature needed to induce scleral injury
Conclusions

• Manual Retraction of the lower lid with the patient looking upwards allows excellent treatment of periocular skin along orbital rim

• Technique does not significantly heat the sclera
  – Eliminates the need for shielding the globe during treatment
  – Did not have subjective effect on vision
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