High Frequency Radio-Wave Device Utilization and the Effectiveness of Treating MGD

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Abstract

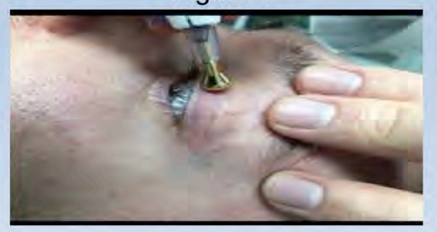
Purpose: Introduce a new method of treatment for meibomian gland dysfunction (MGD) using a high frequency radio-wave (HFRW) device.
Methods: HFRW device used to raise eyelid temperature above melting point of the inspissated meibum. Subjects attended 4 sessions over 2 months and were monitored using objective and subjective measurements.
Results: Statistically significant increase in TBUT from initial to final measurements. Subjective findings showed overall improvement in dry eye symptoms.
Conclusion: Peak effectiveness of the HFRW treatment was 1 month after the initial treatment.

Introduction

MGD is the leading cause of evaporative dry eye and ocular discomfort, characterized by an unstable tear film due to lack of meibum secretion. The physiological melting point of meibum is ~ 32° C. MGD causes the melting point of meibum to increase to ~35° C. At this point the temperature of the upper and lower eyelids (33-37 °C) can't liquefy the meibum.

Increasing the temperature of the thickened meibum via an HFRW device should in theory normalize meibum viscosity and improve MGD. HFRW treatment provides an opportunity to treat MGD with similar effects to more aggressive treatments currently on the market.

Figure 1



Methods

Subjects with established meibomian gland dysfunction were treated with an HFRW device at 4 sessions over the course of 8 weeks. The device was used at the proprietary Pelleve setting with the 10mm attachment (Fig 1). At each encounter subjects filled out a subjective questionnaire, and then objective testing (TBUT, tear osmolarity, meibography) was performed to monitor any changes. Treatment using a HFRW device was then performed.

Treatment using a non-invasive HFRW device over the tarsal portion of the eyelids of each eye was performed on each subject while in supine position by a trained ophthalmologist. The position of gaze was directed away from the device so that the cornea was safe from inadvertent contact. Standard parameters for bringing skin temperatures to 40 degrees Celsius were followed and monitored using an infrared thermometer.

Treatments were completed at the subjects' initial, 2nd, and 3rd visits. Subjects' 4th visit was needed to complete final subjective and objective data collection.

Figure 2

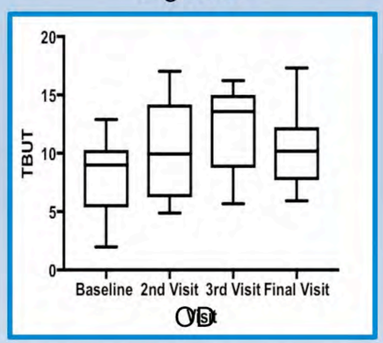
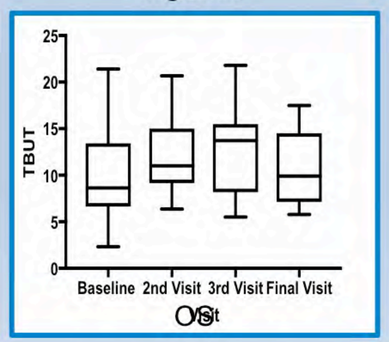


Figure 3

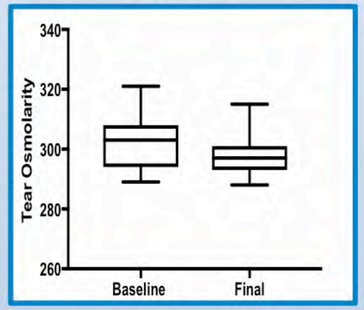


Results

Displayed are box plots of TBUT measurements of both eyes and box plots of initial and final tear osmolarity of 13 subjects.

- A statistically significant increase in average TBUT was seen between initial measurements and measurements taken 1 month after the first treatment (Fig 2, Fig 3).
- We found a non-statistically significant improvement in tear osmolarity between initial and final measurements (Fig 4).
- Each patient reported a gradual improvement in his or her dry eye symptoms over the course of 2 months.

Figure 4



Discussion

- Based on TBUT data, HFRW treatment for MGD reaches maximum effectiveness four weeks from the initial treatment.
- Tear osmolarity also improved over the course of eight weeks.
- Subjective questionnaires showed a gradual satisfaction with the HFRW treatment, with all subjects reporting improvement in their dry eye symptoms.
- Current results would suggest that further investigation into the use of HFRW therapy for treatment of MGD is warranted.

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