



METHODS AND INSTRUMENTS FOR IMPROVING REFRACTIVE OPHTHALMIC SURGERY

ABSTRACT

Biomechanical responses of the eye are used to improve photorefractive procedures. LASIK or PRK treatments, for example, can be improved by taking pre-operative measurement and predicting the corneas's biodynamic response to the ablative treatment. Predictive use is made of the biodynamic response of the cornea due to laser or mechanical keratectomy, that is, creating a corneal flap characteristic of LASIK. Comparison of pre-flap and post-flap, (pre-ablation) data of the cornea such as corneal thickness, flap thickness, corneal topography and wavefront, for example, can provide predictive information applicable to modifying an ablation algorithm before the laser is engaged, either for a current operation or the development of a model. Modeling, by finite element analysis or other mathematical techniques, can also be used to predict post-operative outcomes based on a pre-operative (no flap cut or other surgical intervention) data for the cornea that is input for an accurate eye-model that, in consideration of biodynamic response via the model, provides predictive information for optimizing the success of the refractive surgery and ultimately patient satisfaction.

Figure 1



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