DESCRIPTION OF RESEARCH PROPOSAL

Scientific Area: Clinical Optometry
Keywords: Cornea, Corneal Topography, Keratoconus, Corneal Tomography
University / Department / Sector / Laboratory: University of Western Attica, Department of Biomedical Sciences, Department of Optics - Optometry
Language: Greek

TITLE OF DOCTORAL THESIS

Analysis of Corneal Surface Geometric Parameters with Multiple Optical Imaging Devices: Comparative Study between Devices and Distribution of Geometrical Parameters in Secondary and University-level School Population.

Introduction:

Optical corneal imaging is an essential and fundamental part of both optometric examination and clinical practice in any modern ophthalmologic center, either for the purpose of diagnosing corneal optic function or for designing a possible refractive surgery (laser, cataract), as well as subsequent monitoring and evaluation of postoperative progress.

In addition, it is an important tool for clinical practice in ophthalmology, improving the sensitivity of imaging methods to identify patients with an initial stage of keratoconus, which usually occurs at ages 15 - 25 years. Keratoconus is described as a degenerative, non-inflammatory corneal disorder characterized by

enlargement, thinning, and increased corneal curvature, which causes abnormal astigmatism, is associated with loss of visual acuity and concomitant visual acuity and is the main reason of corneal transplants.

Purpose:

The purpose of this thesis is to study in detail and compare four different and 'innovative' technologies for corneal imaging of the eye.

With this comparative study we will try:

A) Studying the parameters provided by each one, let us come to conclusions about the geometrical parameters of the cornea, as measured by these four systems.

B) Enhance research on the prevalence of keratoconus in specific age groups in the Greek population.

C) Creating normative data on keratoconus markers in the age group of 15-25

Materials and Method

Imaginative Provisions to be Considered:

1. Tomographic Imaging with Scheimpflug imaging technique
2. Tomographic Imaging with Optical Coherence Tomography (OCT)
3. Topographic Corneal Imaging with Placido Technique
4. Topographic Imaging with Encoded LED Emission Point View Technique

The imaging measurements will take place at Laservision.gr Ophthalmological and Research Institute, 15-17 Tsocha Street, Athens

The population that will be involved in the measurements will be 15-25 years old by random selection:

1. High school - high school students
2. Students

The study will be conducted between October 2019 and June 2021. All participants will be informed of the purpose of the study and sign the corresponding consent form. After coding the data, the statistical analysis will be performed with SPSS Statistics version 21.0. The Kolmogorv-Smirnov test will test for the normal distribution of variables. ANOVA test will be applied to variables with normal distribution and Tukey and Bonferroni / Dunn method will be used for statistical significance, while Mann-Whitney U test will be used for non-normal distribution. Pearson and Spearman's correlation coefficient for normal and non-distribution variables will be used to investigate the correlation of the variables between the two eyes. Results are considered statistically significant when p-value <0.05.

Results:

In-depth study of the human eye cornea, with some of the most up-to-date technologies worldwide

• Help improve the parameters and indicators used in clinical application for cornea

• By studying topographic maps in this age group of random Greek populations, research on diseases such as keratoconus and prevention will be strengthened in order not to evolve. This is of particular importance for our country, where this condition is particularly high.

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