

Evaluation Of Quality Of Vision After Photorefractive Corneal Surgeries

Assay

Submitted for partial fulfillment of M.Sc degree in Ophthalmology

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2008

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

" قَالَ رَبِّ اشْرَحْ لِي صَدْرِي (٢٥) وَبَسِّرْ لِي أَمْرِي (٢٦)

وَالْحُلَّ عِفْكَةً مِّنْ لِّسَانِي (٢٧) بِفَقْهُوَا قَوْلِي (٢٨) "

سُورَةُ الْاِنشَاقِ

 *To My Beloved Family* 

Acknowledgement

I am greatly honored to express my thanks to my dear supervisors, **Professor. Dr. Haythm Ezt Nasr** for his support and advice.

I am grateful to **Assistant Professor Dr Reyad Bahi EL Deen Shalash**, who supported me and guided me in this work with his valuable advice and experience.

I am also grateful to **Assistant Professor Dr Mohammad Fakhry Khatab** for his great help and support throughout this work.

Last but not least I would like to thank my dear family to who dedicate this work.

ABSTRACT

The goal of the refractive Surgery is to improve the vision in ametropic eye patients without the aid of spectacles or contact lenses.

The evaluation of postoperative outcome has rationally been based on high contrast distance visual acuity and residual refractive errors which are indeed correlated with overall patients visual function and satisfaction following the surgery. However, there are many refractive surgery patients with minimal residual Sphero-Cylindrical error and excellent UCVA who are dissatisfied with their postoperative visual quality.

In an attempt to identify more sensitive measures to evaluate the visual function following refractive surgery, psychophysical tests should be done. These tests have been considered to give more information about vision than snellen's acuity, especially regarding the visual quality.

For more accurate assessment of visual quality contrast sensitivity testing is currently considered the most reliable way for evaluation of the visual quality.

Key Words:

Assessment of visual quality, Photorefractive procedures, Visual quality after photorefractive corneal surgeries.

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List of Abbreviations

BCVA	Best Corrected Visual acuity
BSCVA	Best Spectacle Corrected Visual acuity
CCD	Closed-Circuit-device
cpd	Cycle Per degree
CS	Contrast Sensitivity
CSF	Contrast Sensitivity Function
D	Diopter
Epi-LASIK	Epi-Polis laser in situ kertonileusis
ETDRS	Early Treatment Diabetic Retinopathy study
FACT	Functional Acuity Contrast Test
LASIK	Laser in situ Keratomileusis
LASEK	Laser assisted Subepithelial Keratomileusis
μM	Micrometer
mm	millimeter
MTF	Modulation Transfer Function
nm	Nanometer
OPD-scan	Optical path difference scanning system
OTF	Optical Transfer Function
PRK	Photorefractive Keratectomy
PSF	Point Spread Function

PTF	Phase Transfer Function
RMS	Root Mean Square
SRR	Spatially Resolved Refractometer
Tracy VFA	Tracy Visual Function analyzer
UCVA	Un-Corrected visual acuity

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*Introduction &
Aim Of The Work*

Introduction And Aim Of The Work

As refractive surgery has grown during the past 10 years, Refractive surgeons now operate on an increasing larger spectrum of ametropia including myopia, astigmatism and hypermetropia.¹

Until recently, the definition of success in refractive surgery was essentially based on clinical criteria such as uncorrected visual acuity(UCVA) ,best corrected visual acuity(BCVA), refraction within one diopter (D) of the targeted correction or the number of snellen acuity lines lost or gained after the procedure.¹

Because refractive surgery candidates have organically healthy eyes, high levels of patient satisfaction are essential, for which quality of vision is critical.²

Although snellen acuity is the standard measure of vision, it dose not measure the visual quality in a wide range of sizes and contrast that represent everyday objects³

For more accurate assessment of visual quality contrast sensitivity CS testing is currently considered the most reliable way for evaluation the quality of vision⁴ as it tests the contrast and glare vision that overcomes the limitation of snellen acuity testing³

The contrast sensitivity function CSF is a measure of contrast sensitivity for range of spatial frequencies and characterizes how well the visual system performs in a complex environment better than snellen acuity measurement.⁵

Photorefractive procedures are surgical procedures that use excimer laser for removing corneal tissue to correct refractive errors³.They includes:

Surface ablation procedures as photorefractive keratectomy (PRK), Laser assisted subepithelial keratomileusis (LASEK) & Lamellar ablation procedures that include Laser in situ keratomileusis (LASIK) & EPI-LASIK.

LASEK is a less invasive procedure than LASIK that allows treatment of thin corneas with achieving good outcome in safety, efficacy and predictability ⁶.

Epi LASIK is a recent surgical procedure in which the separation of epithelial sheet is obtained mechanically without requiring using alcohol or other chemical agent ^{7,8}.

Although photorefractive procedures have a high rate of improving uncorrected snellen acuity, they degradate the visual quality as they increase high order aberrations resulting in reduced night vision clarity, and halos. ⁹

To overcome such drawbacks of photorefractive surgeries, wavrfront analyzer and subsequent wavefront-guided excimer laser ablation has been introduced into refractive surgery. ³ The basic concept of wavefront-guided technology is measurement of wavefront aberrations using an analyzer and conversion of this information into pattern for excimer laser ablation. ³

It is believed that this new generation of wavefront- technology will preserve and even improves visual performance ¹⁰

Aim Of Work

To evaluate the visual quality after PRK, LASIK, LASEK, EPI-LASIK and wavefront guided PRK, LASIK, LASEK

Review of literature