Femto Smile Versus Femto Lasik

Essay

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List of abbreviations

BLMD	Bowman's Layer Micro-Distruction
CDVA	Corrected diStance Visual Acuity
D	Diopter
DLK	Diffuse Lamellar Keratitis
FLEX	Flap Lenticule Extraction
FS-LASIK	Femtosecond Laser Assisted In Situ keratomiLusis
HOA	Higher Order Aberrations
IL	Interlukins
IOP	Intraocular Pressure
LASEK	Laser sub-epithelial keratomilusis
LASIK	Laser Assisted in Situ Keratomilusis
OBL	Obaque Bubble Layer
PRK	Photorefractive Keratotomy
RELEX	Refractive Lenticule Extraction
RSB	Residual Stromal Bed
SMILE	Small Incision LenticuleExtaraction
TLSS	Transient Light Sensitivity Syndrome
TNF	Tumor Necrosis Factor
UDVA	Uncorrected Distance Visual Acuity

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Introduction

During the last 20 years the excimer laser has dominated the field of keratorefractive surgery, initially with surface ablation procedures such as photorefractive keratectomy (PRK). Postoperative wound healing may cause stromal haze formation and affect the long term stability of the obtained refractive correction, with myopic regression as a well-known complication of high myopic correction. ***(Vestergaard et al, 2013).***

Later the flap based laser in situ keratomuilusis (LASIK) has become one of the most performed surgical procedures worldwide due to excellent patient satisfaction, high precision, and very good safety. LASIK is performed as 2 stage operation, which involve the cutting of the flap in the anterior stroma followed by the excimer laser photo ablation of stroma.***(Iskander et al, 2001) (Perez-Santonja et al 1999)***

Within the Last decade femtosecond Lasershave mostly replaced manual microkeratomes for cutting of the LASIK flap (FS-LASIK). Although this may have improved the visual outcome. Several factors may influence the precision of the photo ablative procedure, including corneal hydration, room humidity and patient age. ***(Farjo et al, 2013) (Geggle and Tally, 1999) (Ang et al, 2009) (Walter et al, 2004)***

Surgical extaraction of arefractive lenticule or ReLEX (Refractive Lenticule Extraction) has evolved a new treatment in the field of the keratorefractive surgery. Depending on the method used to access the lenticule,ReLEX can be divided into ReLEX Flex, in which a LASIK like flap allow surgical removal of the lenticule, and ReLEX smile, in which a small incision is created for manual lenticule extraction. ***(Sukundow et al, 2008) (Shah, 2011) (Vestegaard, 2012).***

In contrast to LASIK, Femto-Smile represent a one laser approach, where the critical laser treatment is performed on the intact cornea rather than on exposed corneal stroma. Consequently avoid flap complication as dry eye.

Aim of the work

Is to review the literature regarding Femto-SMILE and Femto-LASIK according to indications, efficacy and refractive outcomes.

Laser And Femtosecond Technology

Laser-cornea interaction

There are four types of interaction between laser radiation and the cornea: absorption, transmission, reflection, and dispersion. The respective importance of absorption and transmission depends on the wavelength of the laser beam. Transmission is maximal at wave lengths between 400 and 1600 nm; this is the case of argon and YAG lasers, which pass through the cornea without significant interactions. Absorption becomes predominant at wavelengths below 350 nm. This is the principal effect used for photoablative corneal surgery ***(table.1) (Montés-Micó et al; 2007).***

Table (1): Characteristics of lasers in ophthalmology**.**

Table 1. Characteristics of lasers in ophthalmology.

Laser	Wavelength (nm)	Effect
Excimer	193	Photoablation
Argon	514	Photocoagulation
Femtosecond	1053	Photodisruption/photodissection
Nd:YAG	1064	Photodisruption
Carbon dioxide	10,600	Photothermal

Nd:YAG: Neodymium-doped yttrium aluminum garnet.

Absorption itself can be broken down into three distinct effects: photothermal, photodisruptive, and photochemical. The photodisruptive effect follows