FEMTOSECOND LASER IN CORNEAL SURGERY

Essay
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By
Omar Mohamed Sayed Said
(M.B., B.Ch.)
Cairo University

Supervised By
Prof. Dr. Fadia Mahmoud Samy El Guindy
Professor of Ophthalmology
Faculty of Medicine
Cairo University

Prof. Dr. Mahmoud Ahmed Kamal
Professor of Ophthalmology
Faculty of Medicine
Fayoum University

Dr. Ahmed Abdel Azim Abdel Kader
Lecturer of Ophthalmology
Faculty of Medicine
Cairo University

Faculty of Medicine
Cairo University
Cairo, ١٩٠٤
Introduction

Photodisruption in biological tissue is a well known interaction process at application of pulsed nanoseconds or picosecond lasers'.

The intensity dependence of the threshold for photodisruption for femtosecond (fs) laser is lowered by more than one order of a magnitude in comparison to ns or ps pulses, decreasing the energy necessary to incise tissues and to decrease damage to surrounding tissues. Using nonlinear absorption as the basic effect of photodisruption, it is possible to process transparent media like the cornea and to perform intrastromal cuts while leaving anterior parts of the tissue unchanged'.

Therefore the Femtosecond (fs) laser is useful in refractive surgery for creating corneal flaps and lenticules during the so called fs LASIK. With the help of this technique problems of the common LASIK procedure using the excimer laser and a mechanical microkeratome can be overcome'.

The IntraLase or Femtosecond (FS) laser is the first major alternative to a mechanical keratome that has been commercially introduced for the creation of the flap during LASIK. The recent incorporation of the Femtosecond laser for the creation of the flap in LASIK seems to offer the same safety and efficacy as the microkeratome when it comes to creating the flap, in terms of thickness and dimensions' &

Also, Femtosecond laser is used for creation of channels for intracorneal ring implantation (INTACS) for the treatment of keratoconus^&^, post-LASIK keratectasia^ and pellucid marginal corneal degeneration^\. It has the potential for significant improvement once the optimal nomogram for channel size, depth, and entry incision has been determined^&. 
Femtosecond laser posterior lamellar keratoplasty is a procedure that may provide an alternative to penetrating keratoplasty or the technically challenging manual posterior lamellar keratoplasty \(^{1,2}\).

The femtosecond laser is investigated for production of different biomechanically stable incisions for penetrating keratoplasty including zigzag incision\(^1\), Top-hat Configuration\(^2\) and Inverse mushroom-shaped\(^3\). Also it is used to correct high residual astigmatism after penetrating keratoplasty using arcuate wedge resection technique\(^4\).

Femtosecond laser corneal dissection provides an alternative to more challenging manual dissection methods for keratoprosthesis implantation. Use of the femtosecond laser microkeratome will further refine keratoprosthesis surgical technique and may allow rapid and easy execution of the surgery \(^5\).

**Aim of the work**

The purpose of this easy is to review the literature highlighting the different applications of femtosecond laser in corneal surgery.
References


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