Intraoperative Perception and Sensation in Laser in Situ Keratomileusis (LASIK)

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Purpose : *To investigate intraoperative perception and sensation during Laser in situ Keratomileusis (LASIK).*
Patients and Method : *Sixty patients with uneventful LASIK were included. All procedures were performed by one surgeon with one technique. Any patient with intra-operative complications was excluded. The patients were asked to fill in the subjective evaluation form regarding their perception and sensation during the operation.*
Results : *Twenty-nine patients (48%) reported no pain and twenty-six patients (43%) reported no burning sensation during the surgery. Nineteen patients (32 %) reported no light perception during the suction period of microkeratome. There was no correlation between duration of the suction and no light perception (R^2 0.01). Thirty-four patients (56%) reported no trouble in maintaining visual fixation at the red light during the laser treatment. Ten patients (16%) reported they could clearly see the movement during the surgery and 5 out of 10 patients (50% of 16%) reported visual frightening. Fifty cases (84%) reported no visual frightening during the surgery after reassurance of the visual experience by the surgeon before the surgery.*
Conclusions : *Patients undergoing LASIK may experience different visual perceptions. Reassurance of the intraoperative perception and sensation before the surgery can reduce the visual frightening.*

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Laser in situ Keratomileusis (LASIK) is currently worldwide recognized by both ophthalmologists and patients. Most of the surgery has been done under topical anesthesia with pre-medicated tranquilizer. Therefore, the patients are almost fully awake. From the authors' experience with a large number of patients, the ability to see the movement and light of the laser machine during the surgery can be the cause of anxiety to the patient who have never had the surgery before. Some patients even ask to take a strong sedative to avoid this perception, which obviously can't be done due to lack of co-operation during the time of laser surgery. Pre-operative counseling about the steps of the procedure is usually been done by most surgeons, but reassurance of intra-operative sensation, somehow, has been ignored. Some surgeons have never been patients themselves, so they have no intra-operative experience. This study was done to evaluate the intra-operative experience of patients during LASIK surgery.

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Patients and Method

Sixty patients who under went bilateral laser in situ keratomileusis (LASIK) under topical anesthesia were included in the present study. A standard questionnaire was used to evaluate the experience of the patient during the surgery. The patients were not informed of the interview preoperatively. The interview was done on the day after the surgery. Any patients with intraoperative complications or unable to complete the questionnaire for any reason were excluded from the study.

The surgery was performed in a fashionable technique by the same surgeon (EC). Preoperative medication including oral acetaminophen 500 mg, oral

diazepam 5 mg, topical tobramycin and topical proparacaine hydrochloride were given to the patients prior to the surgery. A standardized technique for the surgery was used in all cases as follows. A sterile drape was used to cover the patient's eye, then the lid speculum was inserted. Hansatome microkeratome (Bausch & Lomb, Salt Lake City, Utah) was used to create the corneal flap. The flap was then lifted and the laser ablation was performed using the Excimer laser Tachnolas 217z (Bausch & Lomb, Salt Lake City, Utah). After repositioning the flap, irrigation of the interface was carried out using BSS (Alcon Labs, Fort Worth, Texas). The wound edge was checked for the alignment and then the lid speculum was removed. The duration of the suction time, duration of laser ablation times and the duration of the total surgery were recorded.

The interview was done the day after the surgery regarding the following issues.

1. Pain and burning sensation were classified as:
   - None
   - Mild degree
   - Moderate degree
   - Severe degree
2. Light perception during flap creation and laser ablation were classified as:
   - Normal perception
   - Decreased perception
   - Loss of perception
3. Perception of movement during surgery was classified as:
   - Clearly see the movement
   - Some movement was seen
   - No movement was seen
4. Difficulty maintaining fixation light was classified as:
   - No difficulty
   - Difficulty
   - Can not maintain fixation

Results

There were nineteen men (31.6%) and forty-one women (68.4%) included in the study. The mean age was 32.46 years (range 19 to 44 years). The mean preoperative refractive error (spherical equivalent) was -5.54 $\pm$ 2.81 diopters (range -1.00 to -12.00 diopters). Pre-operative uncorrected visual acuity ranged from counting finger to 20/32. The mean duration of the surgery was 15.5 $\pm$ 2.39 minutes (ranged 13 to 25 minutes) and the mean duration of the suction period was 23.4 $\pm$ 2.12 seconds (range 20 to 31 seconds).

Table 1. Number and percentage of patients who experienced different degrees of pain and burning sensation

	No	Mild	Moderate	Severe
Pain	29(48%)	26(43%)	5(8%)	0(0%)
Burning	26(43%)	29(48%)	5(8%)	0(0%)

Table 2. Number and percentage of patients who experienced different degrees of perception of light at different stages of the surgery

	Normal	Decrease	No
Light Perception during the suction period	12(20%)	29(48%)	19(32%)
Light Perception during laser ablation	12(20%)	48(80%)	0(0%)

Table 3. Number and percentage of patients who experienced different degrees of movement and visual fixation during the surgery

	Normal	Decrease movement /movement Difficulty maintain fixation	can't see /can't maintain fixation
Perception of movement	10(16%)	50(84%)	0(0%)
Maintain visual fixation	34(56%)	26(44%)	0(0%)

Pain and burning sensation are shown in Table 1. No patients reported severe pain and burning sensation. Light perception during flap creation and laser ablation were shown in Table 2. Thirty two percent of the patients reported no light perception during the suction period of microkeratome. Perception of movement during surgery and difficulty in maintaining fixation light are shown in Table 3. Five patients (8.3%) reported visual frightening from what they had seen and fifty five (91.7%) patients reported no visual frightening because of preoperative reassurance by the surgeon.

Discussion

Subjective visual experience during ophthalmic surgery varies from one type of surgery to another. Previous studies showed a very unique experience during different types of cataract surgery[1-3]. Reassurance of the intra-operative visual experience to the patient as a part of preoperative counseling can be very useful to allay the fear[1]. In

order to summarize the possible perception and sensation in each type of ophthalmic surgery, many studies have been conducted[1-3]. To the authors' knowledge, no study has been done in Laser in situ keratomileusis (LASIK).

LASIK is one of the most rapid growing ophthalmic surgeries. The number of patients has roughly doubled every year for the past four years. An estimated one million people have gone for the surgery in United States[4]. These patients usually have very high expectation due to the high cost of the surgery. The way to approach this group of patients can sometimes be very difficult. By explaining all the aspects of the surgery not only post-operative risks and side effects, but also intra-operative experience can yield some benefits to both patients and doctors. The present study was conducted to explore perception and sensation during LASIK surgery.

The finding in the present study was as expected. Patients with topical anesthesia usually have more intra-operative discomfort than patients receiving another type of anesthesia[5]. Most of the LASIK patients experienced a mild degree of pain and burning sensation, some did not at all. Even though the pressure during the flap creation increases by ten times more than normal pressure[6], the patients experienced no excruciating pain as in acute glaucoma patients. This could be from the short duration of suction time required in LASIK surgery. Also "gate control theory of pain" which believes that the pain receptor can be controlled by propioceptive receptor (from the suction ring) and might play some role[7, 8]. The increased intra-ocular pressure can also block or reduce the circulation of the optic nerve head and may be the cause of transient decrease in perception of light.

There are several factors that might effect the outcome of the present study. The routine pre-operative medication especially a tranquilizer (oral diazepam) may reduce awareness and concentration to the environment of the patient. Also different microkeratome and excimer laser may have different results on the sensation and perception of the patient. Additional studies should be conducted to collect more data on this issue.

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ความรู้สึกขณะทำผ่าตัดของผู้ที่ได้รับการผ่าตัดแก้ไขสายตาสั้น โดยวิธีเลสิก (LASIK, laser In sItu keratomIleusIs)

สบง ศรีวรรณบูรณ์, เอกเทศ ชันซื่อ

การศึกษาฉบับนี้ทำขึ้นเพื่อรวบรวมข้อมูลทางด้านความรู้สึกในระหว่างการผ่าตัดของผู้ที่ได้รับการทำผ่าตัด LASIK โดยเป็นการทำแบบสอบถามในผู้ป่วย 60 รายที่เข้ามารับการผ่าตัดแก้ไขสายตาสั้นด้วยวิธี LASIK พบว่าในขั้นตอนการแยกชั้นกระจกตามี 19 ราย (32%) ที่มีความสามารถในการมองเห็นเสียไปชั่วคราว ในขณะที่10 ราย (16%) พบว่ามีการมองเห็นที่ปกติตลอดการทำผ่าตัดซึ่งการมองเห็นนี้ทำให้เกิดความกลัวในผู้ป่วยกลุ่มนี้ 50 % และหลังจากได้รับการอธิบายล่วงหน้าแล้วทำให้ลดความกลัวของผู้ป่วยลงได้ 84% จึงพบว่าการพูดคุยอธิบายอาการที่อาจเกิดขึ้นก่อนผ่าตัดแก่ผู้ป่วยจึงเป็นผลดีต่อการทำผ่าตัด