Abstracts

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Learning curve of laser-assisted subepithelial Keratectomy: Influence on visual and refractive results

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Laser-assisted subepithelial keratectomy (LASEK) has become a popular refractive surgery technique because of the absence of stromal flap-related complications associated with laser in situ keratomileusis (LASIK) and because it allows treatment of thin corneas while achieving good safety, efficacy, and predictability. Despite the disadvantages of LASEK (ie, slower visual recovery and higher postoperative discomfort) versus LASIK, the procedure has become the technique of choice in patients with thin corneal pachymetry, those at risk for trauma, and those with corneal surface problems such as dry eye, recurrent erosion syndrome, or basement membrane disease.

When new surgical techniques are introduced into practice, it is important that the surgeon receive good training to enable him or her to perform the new procedure safely and effectively. Nevertheless, such training is not always easy or available. When learning a new technique, some experienced surgeons encounter difficulties that can affect their initial results.

Two studies have reported the results after photorefractive keratectomy (PRK) and LASIK by surgeons training in the procedures and compared them with the results in the literature. One study reported the first LASIK cases of 2 fellows in a refractive surgery program and compared them with the results after 1 year of fellowship.

The purpose of this study was to study the effect of the learning curve of laser-assisted subepithelial keratectomy (LASEK) on the visual and refractive results.

This retrospective study comprised 56 eyes that had LASEK for myopia. The eyes were among the first 143 that had LASEK by the same surgeon with the same excimer laser and same nomogram. The 56 eyes were separated into 2 groups. Group 1 included the first 28 eyes to have LASEK by the surgeon. Group 2 comprised the last 28 eyes in the series whose refractive error could be matched with that in Group 1. The outcomes in the 2 groups were compared.

The mean preoperative spherical refraction was -3.90 diopters (D) ± 1.90 (SD) in Group 1 and -3.70 ± 2.53 D in Group 2 (P = .2). There were no significant differences in preoperative cylinder or best spectacle corrected visual acuity (BSCVA) between groups. The postoperative uncorrected visual acuity (UCVA) was significantly worse in Group 1 on 1 day and 7 days postoperatively (P = .02 and P = .03, respectively); there was no significant difference at 1 month and 3 months. The safety index (postoperative BSCVA/ preoperative BSCVA) and efficacy index (postoperative UCVA/preoperative BSCVA) were better in Group 2, although the difference was not statistically significant. The spherical refraction 3 months postoperatively was +0.50 ± 0.83 D in Group 1 and + 0.10 ± 0.27 D in Group 2 (P = .02); 75% of eyes and 96.42% of eyes, respectively, were within + 0.50 D of the intended correction (P = .01). Seven percent of eyes in Group 1 and no eye in Group 2 lost 2 or more lines of BSCVA.

Authors concluded with the remarks that results indicate that the outcomes of LASEK depend on surgeon experience. Thus, caution is advised when interpreting LASEK results without knowing the surgeon's level of experience.

Reference

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Visual performance and biocompatibility of 2 multifocal diffractive lOLs: Six-month comparative study

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The restoration of near functional capacities is one of the main challenges of modern cataract refractive surgery and refractive lens exchange. Several approaches have been attempted to correct presbyopia after crystalline lens removal based on the implantation of conventional monofocal intraocular lenses (lOLs) such as the monovision strategy and bilateral myopization; however, problems with binocular vision and loss of stereopsis have limited the use of these procedures. Consequently, multifocal lOLs (MIOLs) were designed to provide good uncorrected distance and near vision. Multifocal lOLs have proved to be effective in ensuring distance and near visual performance because they produce a variable number of foci, either finite or infinite, depending on the lens design. However, the light dispersion due to refractive or diffractive optics leads to undesirable symptoms such as glare, halos, and reduction of contrast sensitivity. Moreover, the spherical design of the commercially available MIOLs leads to an increase in the overall spherical aberration of the eye due to a disruption of the cornea lens balance. This is responsible for a degradation in the retinal image quality and thus in the quality of vision.

The purpose of this study was to evaluate the distance and near functional capacity, wavefront error and biocompatibility in patients with 2 diffractive multifocal intraocular lenses (MIOLs).

This prospective study comprised 28 eyes of 28 senile cataract patients having phacoemulsification and implantation of the Tecnis ZM900 MIOL (Group 1) and the AcrySof ReSTOR MIOL (Group 2). The main outcome measures, over a 6-month follow-up period, were spherical equivalent, distance visual acuity at high and low contrast, near visual acuity, and defocus curve. Wave-front error was evaluated in both groups. Capsule opacification was also assessed.

The high and low contrast uncorrected and best corrected visual acuity for distance did not show statistically significant differences between the 2 groups. The distance corrected near visual acuity was 1.86 ± 1.66 in Group 1 and 1.93 ± 1.12 in Group 2. The depth of focus was 4.5 diopters in both groups. The root mean square of total aberration and of spherical and coma aberrations were significantly lower in Group 1 than in Group 2. A higher percentage of patients with Tecnis MIOLs showed a more severe grade of anterior fibrosis. Posterior opacification was minimal and not significantly different between the 2 groups.

Authors concluded with the remarks that diffractive MIOLs were effective in improving functional capacity for distance and near and provided a good quality of vision due to a significant reduction in spherical aberration, particularly in the Tecnis MIOLs. The higher capsular biocompatibility of the ReSTOR MIOL compared with the Tecnis MIOL could ensure long-term stability.

Central corneal thickness changes after phacoemulsification cataract surgery

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The purpose of this study was to evaluate changes occurring in central corneal thickness (CCT) immediately after uneventful cataract surgery.

Thirteen consecutive patients who had uneventful phacoemulsification surgery by the same experienced surgeon were prospectively evaluated for CCT measurements 1 hour preoperatively and 1 hour, 1 day, and 1 week postoperatively. The unoperated eye also had CCT measurements simultaneously on all occasions and served as a control. All patients provided informed consent.

Mean age of the patients was 69 years. Central corneal thickness was 550.34 μm preoperatively, 626.39 μm at 1 hour, 585.80 μm at 1 day, and 553.80 μm at 1 week. In the control group, CCT remained stable, within ±2 μm of preoperative readings.

Authors concluded with the remarks that central corneal thickness increased by approximately 13.81% in the immediate postoperative period (at 1 hour). It remained increased by 6.44% on day 1 compared with preoperative values and gradually reduced to preoperative levels by the 1 week postoperative period (0.57% difference). Intraocular pressure (IOP) measured postoperatively in the first week may be falsely elevated to some extent because of the increased corneal thickness in the immediate postoperative period; thus, not all IOP rises have to be treated in this period in healthy uncompromised eyes.

Pulsed electron avalanche knife: new technology for cataract surgery

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The pulsed election avalanche knife (PHAK-fc, Carl Zeiss Meditec, Jena, Germany) is a new electrosurgical

device, which has recently been introduced for "cold" and traction free dissection of tissue in liquid medium. Similar to dielectric breakdown-based short pulsed laser technology, PEAK-fc works by induction of plasma in the conductive medium or in tissue generated by microsecond pulses of high electric field. Short (up to 100 µs) bursts of electric pulses rapidly vaporize and ionize liquid and tissue in close proximity to the 50 µm wire microelectrode, leading to ablation or dissection of the surrounding tissue. As fc uses pulses not exceeding 100 µs in duration, the heat diffuses to the surrounding tissue only up to 7 µm, thereby inducing only a little thermal collateral damage. The PEAK-fc technique is therefore referred to as "cold" cutting. The heat confinement by use of short-pulse plasma-mediated discharges distinguishes PEAK technology from the conventional continuous radio-frequency devices such as Wet-field Hemostatic Coagulator (Medtronic, Jacksonville, Florida, USA), DIACAPSUTOM (ERBE Elektromedizin GmbH, Tubingen, Germany) or Fugo Blade (MediSURG, Norristown, Pennsylvania, USA).

It was successfully used for a variety of surgical maneuvers commonly encountered in patients undergoing vitreoretinal surgery. Advantages of this new technology include sharply defined transaction and incision of epiretinal membranes, line coagulation of vascularised epiretinal tissue during surgery for diabetic traction detachment and traction-free dissecttion of attached or elevated retina. In these studies PEAK-fc has proven to be a promising culling device for intraocular surgery, allowing for a higher level of microsurgical precision.

On the basis of promising experiences with PEAK-fc in vitreoretinal surgery in the present study we evaluated the applicability of this new microsurgical tool for anterior segment surgery. The safety and efficacy of PEAK-fc were evaluated in various surgical maneuvers in patients undergoing surgery for capsulotomy in pediatric cataracts, mature or post-traumatic cataracts with zonulolysis, posterior iris synechiae after uveitis and massive anterior capsule opacification

The purpose of this study was to evaluate the surgical applicability, safety and potential complications of PEAK-fc in complicated cataract surgery.

The study included five children with congenital cataracts, two patients with advanced senile cataracts, six adults with mature cataracts, three of them with posterior iris synechiae, three patients with post-traumatic cataracts with zonulolysis, one patient with intumescent traumatic cataract and three patients with massive anterior capsule opacification. Anterior and posterior capsulotomies, iris synechiolysis, dissection of anterior capsule opacification and fibrotic scar tissue were performed. PEAK-fc was set at voltages of 500-700 V, pulse duration of 0.1 m and repetition rate of 40-100 Hz.

Anterior and posterior capsulotomies were successfully and safely performed in all eyes. The edges of capsulotomies appeared sharp, showing only limited collateral damage. PEAK-fc worked best by just gently touching the capsule, thereby avoiding tractional forces or pressure on the lens capsule. Posterior iris synechiae could be released and anterior capsule opacification was dissected without complications.

Authors concluded with the remarks that PEAK-fc is a very helpful cutting device for complicated cases of cataract surgery, especially for mature and congenital cataracts, traumatic zonulolysis or anterior segment complications after intraocular inflammation.

Reproducibility and Repeatability of Central Corneal Thickness Measurement in Keratoconus Using the Rotating Scheimpflug Camera and Ultrasound Pachymetry

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Keratoconus is the most frequent corneal ectatic dystrophy and is characterized by progressive non inflammatory corneal thinning with well described slit-lamp findings. In this disorder, corneal thickness measurement is used for diagnosis or staging, follow-up, and planning surgical procedures. Currently, the clinical method most widely used to measure corneal thickness is ultrasound pachymetry; this has the advantages of ease of use, portability, and low cost and has been shown to have a high degree of intra-examiner, inter-examiner, and inter-instrument reproducibility in normal corneas. However, major limitations of ultrasound pachymetry are the need for cornea-probe contact, as well as the variability of measurements caused by probe misalignment or decentering and changes in the speed of sound in corneal tissues with different degrees of hydration. These limitations have led to the introduction of several optical technologies that offer the advantages of a non-contact technique and objective determination of the center of the cornea. Among these, the rotating Scheimpflug camera (Pentacam Oculus, Wetzlar, Germany) calculates thickness and

curvature values for the entire cornea, determining its front and back surfaces. Recent studies have shown that, in normal corneas and in corneal grafts, this method provides central corneal thickness (CCT) measurements that are reproducible, repeat-able, and comparable with those obtained with ultrasound pachymetry.

In keratoconus, the corneal thinning and corneal shape irregularity may reduce the reproducibility and repeatability of the rotating Scheimpflug camera and ultrasound pachymetry. Moreover, in eyes with keratoconus, a low inter-examiner and intra-examiner variability in measuring corneal thickness is required: in clinical practice, this parameter frequently is re-measured in the same eye over time, and in some cases by different examiners, during disease monitoring. This study investigates and compares the inter-examiner reproducibility and the intra-examiner repeatability of the rotating Scheimpflug camera and ultrasound pachymetry in measuring the central thickness of keratoconic corneas; it also assesses agreement between the two pachymetric methods in these eyes.

The purpose of this study was to assess repeatability, reproducibility, and agreement of rotating Scheimpflug camera (Pentacam Oculus, Wetzlar, Germany) and ultrasound pachymetry in measuring central thickness of keratoconic corneas.

In 33 patients with keratoconus (one eye per patient), two examiners each used both pachymetric methods to measure central cortical thickness (CCT); in the same session, measurements then were repeated by examiner 1 (A.M.). The difference between two examiners and between first and second measurements by examiner 1, with both methods and the difference between the two pachymetric methods in measuring central thickness of keratoconic corneas were noted.

With the rotating Scheimpflug camera, inter-examiner correlation was higher (infra-class correlation coefficient [ICC], 0.98 vs 0.76) and inter-examiner variability was lower (95% limits of agreement [95% LoA], -14.8 to 13.8 μm vs -18.0 to +49.5 μm) than with ultrasound pachymetry. Both methods showed close first to second measurement correlation (ICC, > 90), but the rotating Scheimpflug camera had lower variability (95% LoA, -14.5 to 14.2 μm vs -27.4 to 26.0 μm). Mean CCT was 478.9 ± 34.6 μm with the rotating Scheimpflug camera and 486.6 ± 30 μm with ultrasound pachymetry. Although the mean difference was small (-7.8 μm), the 95% LoA (-43.8 to 28.2 μm) showed that the difference between the two methods can be considerable.

Authors concluded with the remarks that in keratoconic corneas, the rotating Scheimpflug camera provides measurements of central thickness that are more reproducible and repeatable than those obtained with ultrasound pachymetry. The rotating Scheimpflug camera seems to be suitable for disease staging and follow-up, when cornea thickness measurements may be repeated over time by different examiners.

Diverse Clinical Presentations of Orbital Sarcoid

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Sarcoidosis is a multisystem granulomatous disease of unknown origin. It can occur at any age, but patients typically are between 20 and 40 years at the time of diagnosis. The distribution is worldwide and affects individuals of any ethnic or racial group. The highest prevalence is reported in White persons of Northern European descent (50 to 60 per 100,000) and among African-Americans (35 per 100,000). Sarcoidosis is thought to be more prevalent in women than in men. It may affect practically any organ system, but pulmonary, dermatologic, and ocular involvement is the most common manifestations. Ocular manifest-tations include uveitis, chorioretinitis, conjunctival, and eyelid granulomas. More rarely, extraocular orbital tissues may be affected, with the lacrimal gland most commonly affected. Extralacrimal involvement includes soft tissue orbital mass, extraocular muscle, and optic nerve sheath sarcoidosis In patients with purely orbital involvement, where there is no evidence of systemic disease, the term "sarcoidal reaction" is used. Over time, we have been impressed with the broad range of presentation of orbital sarcoid. In view of this, we reviewed our experience and report herein the different clinical presentations.

The purpose of this study was to review the clinical presentation, location, systemic features, management, and natural history of orbital sarcoid.

Twenty patients with sarcoid and sarcoidal reactions of the orbit underwent biopsy, excision of localized mass, and systemic and local treatment at a tertiary referral center. Age, gender, onset, symptoms and signs, characterization of disease process, location, systemic disease, associated systemic features, management, and recurrence of the disease were identified.

Of the 20 patients studied, five were male and 15 were female. The mean age was 50.55 ± 16.43 years (range, 18 to 77 years). The most common symptom was the presence of a palpable mass, followed by eyelid swelling. Review of the computed tomographic

scans revealed four main categories of presentation: lacrimal gland infiltration (n = 11; 55%), orbital mass (n = 4; 20%), optic nerve sheath and dural involvement (n = 4; 20%), and extraocular muscle involvement (n = 1; 5%). Concurrent systemic sarcoidosis discovered after the diagnosis of orbital sarcoid was present in 10 cases (50%). The remaining showed no evidence of systemic disease at follow-up. Angiotensin converting enzyme analysis was performed in 10 cases; in only two (20%) was elevated, and in the remaining eight, it was within normal levels.

Authors concluded with the remarks that orbital sarcoid has a diverse clinical presentation varying from lacrimal gland infiltration, soft tissue orbital mass, intraorbital and extraorbital optic nerve sheath and dural involvement, to extraocular muscle involvement. The orbital site most commonly involved was the lacrimal gland.