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for Vision & Ophthalmology

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ORAL PRESENTATIONS

Intravitreal Diclofenac versus Avastin as a Primary Treatment for Diffuse Diabetic Macular Edema

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- **Purpose:** To report the efficacy of a single intravitreal bevacizumab injection versus intravitreal diclofenac as primary treatment for diffuse diabetic macular edema (DME).
 - **Methods:** In this randomized clinical trial 57 eyes from 57 patients with clinically significant DME and no previous treatment were enrolled. The eyes were randomly assigned to either intravitreal Bevacizumab (27 eyes) who received 1.25 mg of intravitreal Bevacizumab or intravitreal diclofenac (30 eyes) who received 500 µg intravitreal diclofenac. Primary outcome measure was change in visual acuity.
 - **Results:** Visual acuity changes \pm SD at 6 weeks were -0.07 ± 0.24 and -0.02 ± 0.18 logMAR in diclofenac and Avastin groups, respectively. At 12 weeks however, corresponding visual acuity changes were -0.08 ± 0.24 and -0.02 ± 0.23 logMAR, respectively. These changes were not statistically significant. CMT reduction was observed only in Avastin group at 6 and 12 weeks (-40 ± 113 and -36 ± 153 µm) whereas CMT increased in diclofenac group at 6 and 12 weeks ($+22 \pm 84$ and $+26 \pm 66$ µm).
- Changes in intraocular pressure and progression of cataract were minimal in both groups. Anterior chamber reactions were observed (10% for diclofenac and 11% for Avastin)
- 12 weeks after injections leakage decreased in 16%, increased in 44% and did not change in 40% of the eyes that had received Avastin but in eyes receiving diclofenac, leakage decreased in 32.1% increased in 35.7% and did not change in 32.1% of the eyes.
- **Conclusion:** Up to 12 weeks, intravitreal diclofenac yielded better visual outcome in patients with DME than Bevacizumab; however, visual acuity changes in the groups were not statistically significant at either 6 weeks or 12 weeks. Unlike bevacizumab, Intravitreal diclofenac was not associated with decrease in CMT. Further clinical trials with longer follow-up are required to evaluate the long-term visual outcomes and complication profiles after primary treatment with such medications.

Changes of Aqueous Zinc Level in Cataract

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- **Purpose:** Human crystalline lens is subject to chronic stresses of exposure to light or other high-energy radiation and oxygen. These insults can cause oxidative damage to lens constituents which is thought to be causally related to cataract genesis. Some epidemiological studies indicate that nutrient intake is related to risk of cataract and that nutrition might be exploited to diminish the risk for this debility. Among these, numerous theories have suggested that proper micronutrients metabolism may have an associated role against cataract development. One of these micronutrients, zinc (Zn) is a component in a multitude of biochemical functions with at least 300 Zn metalloenzymes having been identified. In this study we aimed to assess the concentration of Zn in aqueous humor of subjects with cataract to gain better insight into the relationship between Zn and cataract formation.
- **Methods:** In a comparative, observational study, we enrolled 65 subjects to determine aqueous zinc levels. Group 1 comprised of patients with cataract who were candidates for cataract surgery. Group 2 were eligible controls who had clear lenses and were candidate for pars plana vitrectomy. All patients and controls were selected from eye clinics of teaching hospitals in Tehran, belonged to the same geographical location in the Tehran vicinity and had similar dietary habits. Patients with systemic problems such as diabetes, hypertension and hyperlipidemia were excluded from the study. Aqueous samples (0.1-0.2 ml) were gathered just at the beginning of surgery by a 27-gauge needle. Samples were transferred to the Cellular Molecular Research Center where they were stored at -86°C , and subsequently analyzed for Zn content in triplicate by atomic absorption spectrophotometry (Unicam 92, UK).
- **Results:** Group 1, subject group, included 44 patients (21 male, 23 female) diagnosed with cataract. The mean age of the subject group was 61.6 ± 15.35 years.
- **Conclusion:** The Zn concentration in aqueous humor was significantly higher in cataractous patients including both male and female subjects ($p=0.001$) in comparison to controls. Differences between aqueous humor Zn levels of patients in sub-groups were not statistical

Oxygen Tension in the Aqueous Humor of Glaucoma Patients

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- **Purpose:** To compare oxygen tension in the aqueous humor of patients with primary open angle glaucoma (POAG), pseudoexfoliation glaucoma (PXG) and neovascular glaucoma (NVG) with that of ophthalmologically normal subjects with senile cataract.
- **Methods:** In this prospective comparative case series 82 eyes of 82 patients with POAG (22 eyes), PXG (20 eyes), NVG (18 eyes) and cataract (22 eyes) scheduled for intraocular surgery were evaluated. At the beginning of surgery and while breathing room air, 0.2 ml of aqueous humor and 1 ml of arterial blood were aspirated in heparinized syringes under sterile conditions. Partial oxygen pressure (PO₂), carbon dioxide (PCO₂) and pH of the samples were measured using a blood gas analyzer machine (AVL Compact 3 Blood Gas Analyzer, Roche Diagnostics, Graz, Austria).
- **Results:** The only baseline difference among the study groups was in terms of age and level of IOP; POAG patients were significantly younger ($P < 0.001$), and eyes with POAG and NVG had significantly higher IOP as compared to control subjects ($P < 0.001$).

Overall, aqueous PO₂ was comparable among the study groups ($P = 0.202$). In each group, patients with controlled and high IOP were analyzed separately; Post Hoc test showed a significant difference in aqueous PO₂ between POAG subjects with high IOP and control eyes ($P = 0.046$). After omitting the effect of study group, a statistically significant ($P = 0.045$) inverse correlation (-0.184) was observed between IOP and aqueous PO₂. NVG patients had the weakest correlation. After excluding NVG patients, the correlation became stronger ($r = -0.347$, $P = 0.008$) showing a 1 mmHg decrease in aqueous PO₂ for every 3 mmHg increase in IOP. The strongest correlation was observed in the POAG group ($r = -0.507$, $P = 0.016$).

Aqueous PO₂ was consistently higher than arterial PO₂ (PaO₂) in all study groups and the difference between them was significant in the cataract and PXG groups ($P = 0.013$ and $P < 0.001$, respectively). The least contribution of atmospheric (ambient) oxygen to aqueous PO₂ occurred in the POAG group which had the highest IOP (Table 5).

- **Conclusion:** The findings of this study may support the ischemic theory in POAG. Paradoxically high PO₂ in NVG indicates the compensatory nature of new vessels and that the glaucomas are a heterogenous group of diseases with different pathogenetic mechanisms.

The Effect of Amniotic Fluid (AF) on Human Retinal Pigmented Epithelial (RPE) Cell Dedifferentiation

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- **Purpose:** Seeking for retinal-neural progenitor cells as a prospective therapeutic substrate for eye diseases, RPE cell cultures were established and treated with human amniotic fluid (AF). AF is an organic pure composite having tremendous proliferative impacts on multipotent embryonic cells. AF effects on the cultured RPE cells were evaluated utilizing several methods.
- **Methods:** RPE cells harvested from neonatal cadaver globes, obtained from Central Eye Bank of Iran, were cultured in Dulbecco's Modified Eagle Medium (DMEM):F12 supplemented with 10% Fetal Bovin Serum (FBS). In definite passages, cells were trypsinized and co-cultured with 30% AF (obtained from normal fetuses with gestational ages of about 14-16 weeks). AF inductive growth effect on RPE cells from different passages was assessed employing ELISA cell proliferation and cell death kit according to the supplier instruction manual (Roche, Germany). Retinal progenitor markers' (PAX6 & CHX10) expression was assessed and enumerated through immunocytochemical analysis of RPE cells from passage 6, according to Santa Cruz protocol. Confirming the previous data, RNA extraction (QIAGEN, Germany), cDNA synthesis and real-time polymerase chain reaction (RT-PCR) (Roche, Germany) were also performed.
- **Results:** ELISA assay represented a salient increase in RPE cells' growth rate cultivated in 30% AF, compared with those grown in the absence of AF. No meaningful disparity in proliferation rate was discerned between treated and control (FBS) cultures. Immunocytochemical analysis exhibited nuclear localization of progenitor markers in a ratio of 33% and 27% for CHX10 and PAX6 respectively. This indicated a 3 fold raise in AF treated cultures compared to control cultures, real-time PCR data was concurring with the foregoing results approving the AF capacity of promoting progenitor cell propagation.
- **Conclusion:** The presented data imply the phenomenal influence of AF on RPE cells' culture, indicating its qualified fitness for FBS replacement in the medium and its potential to induce RPE cells proceeding toward progenitor cells. These progenitor cells can be a convenient source for cell replacement therapy in retinal diseases.

The Role of Orbital Vessels Color Doppler Imaging in Early Diagnosis of Diabetic Retinopathy

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- **Purpose:** Color Doppler imaging (CDI) is a new noninvasive technique that enables measuring blood flow velocity in small orbital vessels. The purpose of this study is to compare CDI indices of orbital vessels in type II diabetic patients with control groups.
- **Methods:** In a cross-sectional study, right eyes of 136 samples were entered into five groups as I: newly diagnosed diabetic patients, II: diabetic patient without retinopathy, III: diabetic patient with non-proliferative retinopathy, IV: patient with impaired glucose tolerance test (IGT) and V: healthy controls and CDI was used to measure the peak systolic velocity (PSV), end diastolic velocity (EDV), resistive index (RI) and pulsatility index (PI) of ophthalmic artery (OA), central retinal artery (CRA), central retinal vein (CRV), and posterior short ciliary artery (PSCA). Optic nerve diameter was also measured.
- **Results:** No significant differences were seen in ophthalmic artery PSV and EDV between all groups but RI and PI of OA in the third group were significantly higher than others. PSV of CRV in the third group was significantly higher in comparison with other groups. (P-value=0.002) Optic nerve diameter showed no difference between studies group. (p=0.008) Some correlation between HbA1C level and CDI indices and disease duration were found.
- **Conclusion:** CDI is a rapid, reproducible, and noninvasive technique in early diagnosis of hemodynamic alteration of the orbital vessels and diabetic retinopathy, especially in patients with misty or impossible fundus examination or fluorescein angiography

Transplantation of Retinal Pigment Epithelial (RPE) Cells Differentiated From Induced Pluripotent Stem (iPS) Cells in the Subretinal Space of a Retinal Degeneration Rat Model

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- **Purpose:** Human induced pluripotent stem cells (hiPSC) have the potential to differentiate into any cell type such as retinal pigmented epithelial (RPE) cells, rendering them a potential source for the treatment of a wide range of diseases such as age-related macular degeneration, retinitis pigmentosa, and Stargardt disease. Here, we describe a new efficient protocol to differentiate hiPSCs to RPE cells and their transplantation into rat model of retinal degeneration.
- **Methods:** The Royan hiPSC1 line was induced to RPE cells by morphogens. Pigmented area then was isolated and expanded to form a highly differentiated RPE monolayer. The hiPSC-RPE cells were analyzed by RT-PCR, Real-Time PCR immunofluorescent staining and flow cytometry. Subretinal transplantation of iPSC-derived RPE cells was performed in sodium iodate injected rats. Functional analysis (ERG and optomotor test) and immunohistochemistry evaluation are performing.
- **Results:** We found that differentiated iPSC-RPE cells were morphologically similar to mature human RPE cells. Gene expression was significantly changed during differentiation and marker proteins were appropriately expressed and localized in polarized pigmented monolayers. After transplantation, the homing of BrdU-labeled cells was observed in the subretinal space during the second week and first month after transplantation. The follow up of transplanted cells is ongoing.
- **Conclusion:** These findings suggest that hiPSCs may provide an unlimited source for RPE cells not only for drug development and screening; in-vitro disease modeling but also for cell-replacement therapy in eyes with retinal degenerative diseases due to primary RPE dysfunction.

Automated Detection of Diabetic Retinopathy Vascular Lesions (Microaneurysms) in Fluorescein Angiography by Image Processing Methods

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- **Purpose:** The main objective of this research is to aid in developing automated screening systems for diabetic retinopathy. Such systems will significantly help ophthalmologists in diagnosing and treating patients.
- **Methods:** A set of selected images consisting of 35 training and 85 test images were used for analysis. Gold standard was defined by manual detection of microaneurysms on selected images by and image reader which is stored in a database named "Mashhad University of Medical Science Diabetic Retinopathy Image Database" (MUMS-DB).

Firstly, we detected optic nerve head by using radon transform and multi overlapping windows after masking. In preprocessing stages at first we used top-hat transformation and subsequently, we applied averaging filter and subtracted the result of filtering and top-hat. In the main section we detected and localized the vascular lesion related to diabetic retinopathy by dividing the whole preprocessed images to multi overlapping sub images (windows) and radon transformation of these sub-blocks.

After retinal vascular tree and optic nerve head are detected and masked, microaneurysms will be detected and numbered by using appropriate thresholding.

- **Results:** In this study the sensitivity of diagnosis for diabetic retinopathy was 94%; with a specificity of 75% and sensitivity of precise microaneurysm localization was 92%.
- **Conclusion:** This project addresses a novel method in detection of retinal landmarks and lesions to diagnose diabetic retinopathy. High sensitivity of this method, encourage the usage of it as a first phase screening for diagnosis of diabetic retinopathy.

Macular Thickness variation in Hypertensive Patients Measured by Optical Coherence Tomography

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- **Purpose:** To evaluate the macular thickness map in hypertensive patients with no maculopathy during hypertension episodes.
- **Methods:** 20 patients were selected from 56 subjects to undergo Optical Coherence Tomography (OCT) of macula. They were divided in two groups of normotensive (n=10) and hypertensive subjects (n=10). The groups two underwent macular OCTs 72 hours apart. For the second evaluation hypertensive patients had a controlled systolic blood pressure less than 120mmHg. Mean macular thickness, systolic blood pressure, VA and BCVA at two periods of examination.
- **Results:** Nine out of ten in hypertensive group showed a decrease in Mean Macular Thickness after 72h with a controlled blood pressure whereas the ten patients in normotensive group had almost same results after 72h (P<0.5)
- **Conclusion:** Blood pressure may induce a false high grade of macular thickness during episode of hypertension. Considering this, measuring of blood pressure in hypertensive patients should be done prior to the macular OCT procedure.

Results of Bilateral Medial Rectus Muscle Recession in Unilateral Esotropic Duane Syndrome

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- **Purpose:** To report the results of bilateral medial rectus muscle recession in improvement of the ocular alignment and motility in patients with unilateral esotropic Duane syndrome.
- **Methods:** All medical files of patients with Duane syndrome visited by the first author between 1997 and 2006 were reviewed. Pre- and postsurgical deviation, angle of abnormal head position, severity of limitation in abduction, severity of globe retraction, and upshoots and downshoots were compared.
- **Results:** Twenty-five patients with unilateral esotropic Duane syndrome (type 1) underwent recession of both medial rectus muscles. Mean age of patients was 9.7 years: male-to-female ratio was 0.67 (10:15). The left eye was involved in 23 of patients. Mean esotropia decreased from 24.3(Delta) (range, 12(Delta)-50(Delta)) to 1.3(Delta) (range, 0(Delta)-10(Delta)). Mean abnormal head position decreased from 21.4 degrees (range, 15 degrees-35 degrees) to 1 degree (range, 0 degree-5 degrees). Esotropia and abnormal head position disappeared in 80% of the patients and improved in the remaining. None of the patients developed exotropia. Mean limitation in abduction decreased from -3.8 to -3.3. Globe retraction was eliminated in 14 of the patients and improved in the others. Mild upshoots and downshoots, which were observed in 5 patients, disappeared in 2 and improved in 3 patients.
- **Conclusions:** Bilateral recession of medial rectus muscles has resulted in improvement of deviation, abnormal head position, and globe retraction in patients with unilateral esotropic Duane syndrome.

Discrete Localization of Various Fatty-Acid-Binding Proteins in Various Cell Populations of Mouse Retina

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- **Abstract:** Various fatty acids (FAs) are involved as an energy source in many different functions in the organism. They are also essential ingredients of membranous lipids and act as intracellular signaling molecules. Intracellular fatty-acid-binding proteins (FABPs) comprise a family of soluble lipid-binding proteins with low molecular mass and solubilize long-chain FAs to allow intracellular translocation in the aqueous cytosol. To clarify the functions of FABPs in the retina, which is remarkably rich in polyunsaturated FAs, we have investigated the localization of B (Brain type)-, H (heart type)-, E (epidermal type)-, and A(adipocyte type)-FABPs in adult mouse retinæ by immunohistochemistry.

In order to determine the possible involvement of FABPs in retinal degenerative diseases, we have also examined changes in FABP expression in light-induced

Photoreceptor cell degeneration (photic injury). The discrete localization of B-, H-, E-, and A-FABP species in various cell populations of the retina has been clarified: B-FABP is mainly localized in the cone photoreceptor cells, H-FABP in some populations of amacrine/bipolar/horizontal interneurons, and

E-FABP in ganglion cells, with A-FABP-like immunoreactivity being located in resident microglia of normal retinæ. E-FABP has further been localized in invasive macrophages in damaged retinæ following photic injury, allowing discrete identification of the resident microglia and invasive macrophages by A- and E-FABP immunoreactivity, respectively.

Comparison of Inferior Oblique Muscle Recession and Myectomy on Inferior Oblique Over action (IOOA)

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- **Purpose:** Determining the effect of recession and myectomy on inferior oblique over action.
- **Method:** This study was performed on 50 patients (82 eyes) with inferior oblique over actions (IOOA) that were surgery candidates and randomly divided to two groups of recession and myectomy. We did complete eye examination before the operation. We cut 5mm from IO muscle in inferior temporal region when using myectomy procedure; in the other group (recession) after disinserting the IO muscle it was sutured to 2mm lateral and 3.5 to 4mm posterior to insertion of inferior rectus muscle. After at least 3 months we performed the same eye exam again. We considered IO +1 to be a successful surgery.
- **Results:** We included 25 males (50%) and 25 females with a mean age of 12.3 ± 5.9 years and age range of 3-32 years in our study. The surgery was performed in 18 patients unilaterally and in 32 patients bilaterally. Both Myectomy and Recession methods of surgery showed to be successful in reducing the IOOA, this reduction was statistically significant in both groups. ($PM < 0.001$, $PR < 0.001$). In Myectomy method the reduction in IOOA was 2.37 grades and in Recession method the reduction was 1.92. The difference between these two methods was not statistically significant ($P = 0.097$) when using Mann-Whitney method but it was statistically significant when using ordinal logistic regression ($P = 0.016$). We found primary IOOA without superior oblique under action (SOUA) in 28 eyes (66.6%) in M group and 32 eyes (80%) in R group. Secondary IOOA with SOUA was found in 14 eyes (33.4%) of M group and 8 eyes (20%) of R group, respectively. In patients with more initial over action both Myectomy and Recession methods resulted in better reduction ($PR < 0.001$, $PM < 0.001$) compared to patients with less initial over action. We found postoperative residual IOOA in 12 eyes (28.6%) in M group and 22 eyes (65%) in R group. We had normal IO function in 21 eyes (50%) of M group and 12 eyes (30%) of R group. Finally 9 eyes (21%) in M group and 4 eyes (15%) in R group showed IOUA after surgery. There was no statistically significant difference in outcomes of the two methods of surgery ($P = 0.051$). Both methods resulted in equal correction of SOUA and V-pattern. The complications of this series of surgery included new hypertropia (HT) in 2%, new DVD in 8% and new asymmetry in 2% of the patients.
- **Conclusion:** The results of this study suggest the Myectomy method to be more effective in correction of IOOA. Considering safety, these two methods did not have a statistically significant difference. Both methods were more effective if the initial over action was larger.

Oxidative Stress May Be Involved in the Pathogenesis of Primary Congenital Glaucoma

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- **Purpose:** Recently, evidence for the role of oxidative stress in the etiology of glaucoma has accumulated. Two of the five known causative genes for glaucoma, CYP1B1 and MYOC, are known to have functions relevant to oxidative stress. Detection of oxidative deoxyribonucleic acid damage in the eyes of glaucoma patients and systemic reduction in the level of antioxidants in the aqueous humor of primary open angle glaucoma (POAG) patients provides direct evidence for involvement of oxidative stress in POAG pathogenesis. Comparable data with regards to primary congenital glaucoma (PCG) has not been reported. However, there is increasing evidence for similarities between POAG and PCG. For example, CYP1B1 mutations are seen in both PCG and POAG patients and there are families in which some individuals are affected with PCG and others with POAG.
- **Methods:** Given this background, we queried the possibility that oxidative stress may be involved in PCG pathogenesis by studying its effect on the expression of LTBP2, a recently identified PCG causing gene. We established trabecular meshwork (TM) cell cultures and exposed the cells to hydrogen peroxide in order to simulate conditions of chronic oxidative stress. The TM is of critical importance in maintenance of the aqueous fluid outflow system and in control of intraocular pressure (IOP), functions relevant to PCG pathogenesis. Gene expression analysis was performed by real time PCR.
- **Results:** In analysis of three TM cultures, an average two fold increase in LTBP2 expression was observed.
- **Conclusion:** These preliminary findings are consistent with the proposal that oxidative stress may be involved in the PCG pathogenesis. This finding needs to be pursued as it may lead to novel treatments of patients affected with PCG.

Comparison of Anterior Chamber Depth Measurements Using Galilei, HR Pentacam, and Orbscan II

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- **Purpose:** Anterior chamber depth measurement is used frequently in cataract and refractive surgery for advanced intraocular lens (IOL) power calculation formulas and implantation of phakic IOLs. In this article, we show agreement in anterior chamber depth measurements in normal eyes among 3 noncontact systems, namely Galilei, HR Pentacam, and Orbscan II.
- **Methods:** The anterior chamber depth measurements were obtained with Galilei, HR Pentacam, and the Orbscan II in both eyes of 37 healthy subjects. Pearson's correlations were calculated, and mean anterior chamber depth measurements were compared. Bland-Altman plots were used to assess the difference between individual measurements for each patient.
- **Results:** The mean anterior chamber depth readings (\pm standard error of mean) with Galilei, Pentacam, and Orbscan were 3.22 ± 0.05 , 3.25 ± 0.05 , and 3.54 ± 0.07 , respectively. The difference between Galilei and Pentacam was not statistically significant ($P = 0.013$). However, Orbscan measurements were larger than those of either Galilei or Pentacam ($P < 0.001$). The differences between Orbscan and either Galilei or Pentacam increased with greater anterior chamber depths. The 95% limits of agreement between Orbscan and Galilei, Orbscan and Pentacam, and Pentacam and Galilei in different ranges of chamber depth were (< 3 mm, -0.43 to $+0.71$ mm); [3 to 3.5 mm, -0.23 to $+0.83$]; [> 3.5 mm, $+0.41$ to $+0.53$], (< 3 mm, -0.43 to $+0.71$ mm); [3 to 3.5 mm, -0.26 to $+0.80$]; [> 3.5 mm, $+0.38$ to $+0.54$], and (< 3 mm, -0.05 to $+0.06$ mm); [3 to 3.5 mm, -0.06 to $+0.10$]; [> 3.5 mm, -0.11 to $+0.12$], respectively.
- **Conclusions:** These data indicate that in the assessment of normal eyes, Orbscan gives consistently higher measurements for anterior chamber depth compared with Galilei and Pentacam. Because the differences between Orbscan and either Galilei or Pentacam were not within clinically acceptable levels, they are not interchangeable in every clinical situation. However, the differences among anterior chamber depth values measured with Galilei and Pentacam were within clinically acceptable levels. Thus, these 2 systems can be regarded as interchangeable.

Pentacam as a Tool for Assessing the Risk of Developing Acute Angle Closure

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- **Purpose:** To compare anterior segment and ocular biometric parameters in unaffected fellow eyes of patients with a previous attack of acute angle closure (AAC), primary angle closure suspect (PACS) eyes, and normal eyes; and to assess the risk of developing AAC in PACS.
- **Methods:** Pentacam and A-scan echography were performed in all cases.
- **Results:** Age, CCT and LT were comparable among the study groups (all P values > 0.05). Mean ACA was 24.8° , 22.9° and 35.4° in groups I, II, and III, respectively ($P < 0.001$). Corresponding values for ACV were 72, 76 and 172 μ l, respectively ($P < 0.001$). Central ACD measured from the endothelium was 1.80, 1.91, and 3.09 mm in groups I, II, and III, respectively ($P < 0.001$). Using ROC curves, $ACV < 100 \mu$ l was associated with a high risk of AAC with sensitivity of 91.7% (95% Confidence Interval (CI): 70 to 99) and specificity of 100% (95% CI: 89 to 100). Corresponding values for $ACA < 25^\circ$ were 75% (95% CI: 51 to 90) and 93.3 (95% CI: 79 to 98), and for $ACD < 2.1$ mm were 86.7% (95% CI: 62 to 96) and 100% (95% CI: 89 to 100), respectively. If two of these three criteria ($ACV < 100 \mu$ l, $ACA < 25^\circ$ and $ACD < 2.1$ mm) are present, the eye can be considered at high risk for an attack of AAC with sensitivity of 93.3% (95% CI: 70 to 99) and specificity of 100% (95% CI: 89 to 100).
- **Conclusion:** Eyes with $ACV < 100 \mu$ l, $ACA < 25^\circ$ and $ACD < 2.1$ mm should be considered at high risk for developing acute angle closure and can be considered for prophylactic laser peripheral iridotomy (LPI).

FOXC1 May Regulate MYOC Expression in the Trabecular Meshwork H.

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- **Purpose:** FOXC1 is a transcriptional factor whose functions are relevant to eye development and function. It is expressed in the periocular mesenchyme during murine eye development, and its expression is later detectable in the trabecular meshwork (TM) and conjunctiva. FOXC1 expression is also evident in cultured TM cells derived from adult humans. FOXC1 has been implicated in various eye anomalies, including glaucoma. Mice with targeted deletions in FOXC1 exhibit absence of anterior chamber formation. Mutations in FOXC1 and alterations in gene copy number are also a cause of Axenfeld-Rieger syndrome (ARS), and ARS patients with FOXC1 defects are prone to developing glaucoma. It appears that the mutations impair proper regulation of FOXC1 target genes. In studies on non-ocular tissues, FOXC1 expression has been shown to correlate with TGF β 1 concentrations. It is well known that TGF β 2 levels are increased in the aqueous humor of glaucomatous eyes.
- **Methods:** Given this background, we set forth to identify potential FOXC1 target genes in human TM cultured cells. Knockdown of FOXC1 was accomplished by use of iRNA, and target genes analyzed were MYOC, CYP1B1, TGF β 1, and TGF β 2.
- **Results:** It was observed that FOXC1 knockdown caused 2-4 fold reduction of MYOC expression in four TM cell lines.
- **Conclusion:** The finding is of notable importance, as MYOC is a glaucoma causing gene. It has not been ascertained whether FOXC1 regulation of MYOC is direct or indirect.

Epidemiology of Orbital and Preseptal Cellulitis in a 10 Year Period in Labbafinejed Hospital

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- **Purpose:** To evaluate the epidemiology of orbital and preseptal cellulitis in Labbafinejed Hospital in a 10 year period.
- **Method:** This was a retrospective study on files of patients with orbital and preseptal cellulitis which were admitted to Labbafinejed Hospital. In this study Clinical specificities and results of treatment and complications were studied.
- **Results:** This study included 93 patients who were admitted to our center from 1376 to 1386. 42% of them had orbital and 58% had preseptal cellulitis. Orbital cellulitis was 2 times more common in males than females but preseptal cellulitis was equally frequent in both sexes. Mean age of patients in orbital cellulitis was 27.4 ± 23.9 years and for preseptal cellulitis 19.1 ± 23.3 , 97.8% of cases were unilateral. Mean time from affection to referral was 4 days and mean admission time for orbital cellulitis was 6 days and for preseptal cellulitis was 4.5 days. The most common complaint of the patients was change in appearance. The most common season was spring. The most common background was sinusitis in %53.8 of orbital and %24.1 of preseptal cellulitis. The most common involved sinus was ethmoid.
- Mean antibiotics used to treat were 2 items. Surgical intervention was needed in %48.7 of orbital and %14.8 of preseptal cellulitis. The only complication seen in orbital cellulitis was extraocular muscle palsy in a case which needed operation.
- **Conclusion:** Orbital and preseptal cellulitis is seen most frequently in young patients inspring and the most common background for it is sinusitis and with treatment of background diseases may be prevented.

The relationship between Corneal Biomechanical Measurements and Ablation Depth in Photorefractive Keratectomy

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- **Purpose:** To evaluate the relationship between corneal biomechanical measurements and ablation depth in photorefractive keratectomy
- **Methods:** In 100 eyes with myopia and myopic astigmatism the Ocular Response Analyzer (ORA) was used to measure corneal hysteresis (CH), corneal resistance factor (CRF), Goldman-correlated intraocular pressure (IOPg), and corneal-compensated IOP (IOPcc) before and 3 months after custom PRK.
- Preoperative manifest refraction spherical equivalent (MRSE), central corneal thickness (C.C.T) and ablation depth (AD) were recorded. The changes of parameters after PRK were calculated and correlation between attempted correction of MRSE and AD, and correlation between the AD and the change in CH (DCH), change in CRF (DCRF) were examined.
- **Results:** Preoperative mean attempted correction of MRSE, C.C.T and mean AD were -4.13 ± 1.98 D, $543 \pm 33 \mu$ and $75.05 \pm 31 \mu$, respectively. The preoperative mean CH and CRF (9.98 ± 1.37 mm Hg and 10.14 ± 1.47 mm Hg, respectively) were significantly higher than postoperative values (7.53 ± 1.82 mm Hg and 6.69 ± 1.69 mm Hg, respectively) ($P < 0.001$).
- The higher attempted correction of MRSE was correlated with higher AD ($RS = 0.87$ $P < 0.001$), higher DCH ($RS = 0.41$ $P < 0.001$), and higher DCRF ($RS = 0.66$ $P < 0.001$).
- **Conclusion:** Changes in CH and CRF after custom PRK suggest alteration in corneal biomechanics correlated with attempted correction.

Comparison of the Efficacy and Safety of the Ahmed Glaucoma Valve (AGV) Alone, or with Mitomycin C or with Amniotic Membrane for Treatment of Refractory Glaucoma

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- **Purpose:** To compare the efficacy and safety of the Ahmed glaucoma valve (AGV) alone, or with mitomycin C or with amniotic membrane for treatment of refractory glaucoma.
- **Methods:** In this randomized clinical trial, 68 eyes of 68 patients with refractory glaucoma underwent AGV implantation in 3 groups: A, AGV alone, B, AGV with mitomycin C, and C, AGV with amniotic membrane. The main outcome measure was success rate; other outcome measures included hypertensive phase and complications. Complete success was defined as $6 < IOP < 21$ mmHg without medications, partial success as $6 < IOP < 21$ mmHg with 1 or 2 medications and overall success as the sum of complete and partial success rates. Failure was defined as $IOP > 21$ mmHg or $IOP < 21$ mmHg with 3 or more medications. Other criteria for failure included loss of vision shunt extrusion and need for additional glaucoma surgery.
- **Results:** From a total 68 eyes, 23 eyes underwent AGV implantation alone (group A), 25 eyes underwent AGV with mitomycin C (group B) and 20 eyes underwent AGV with amniotic membrane (group C). Baseline characteristics were comparable in the study groups. On average patients were followed for 46.4 ± 11.6 weeks in Group A, 45.3 ± 10.2 in Group B and 47.2 ± 7.5 weeks in Group C ($P = 0.813$). BCVA was comparable among the study groups at all postoperative visits ($P > 0.165$). Intraocular pressure was comparable among the 3 groups at all follow up intervals except for week 3 at which IOP was lower in group B ($P = 0.039$). The mean number of glaucoma medications was comparable among the three study groups during the period of follow up ($P > 0.101$). Overall success was 86.4% in group A, 83.4% in group B and 85% in group C ($P = 0.784$). Complications occurred in 39.1% of eyes in group A, 40% in Group B and 55% in group C ($P = 0.278$). The most common complications were decreased VA > 2 lines (27%) and hyphema (22%). Hypertensive phase occurred in 81.8% of eyes in group A, 60% in group B and 70% in group C ($P = 0.227$).
- **Conclusion:** The use of adjunctive mitomycin C and amniotic membrane with AGV entails similar intermediate efficacy in terms of IOP reduction and success rate in shunt surgery for refractory glaucoma. The incidence of hypertensive phase and complications were comparable to AGV alone and no significant advantage was seen with use of these adjuncts.

Segmentation of Blood Vessels in Fundus Color Images by Radon Transform and Morphological Reconstruction

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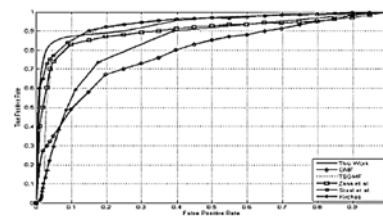
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- **Purpose:** The aim of this project is to detect vessels in retinal images of individuals and make a good discrimination between blood vessels and other pathological elements like microaneurysms and hemorrhages which have the same color as vessels.
- **Methods:** The algorithm consists of six steps including preprocessing, exudates detection, background elimination, mask creation, marker creation, and vessel tree reconstruction. In the preprocessing step, our aim is to unify the histogram of all available images. In exudates detection step, those regions of image that EXs appear are detected and removed. In background elimination the image background is filtered to some extent and the foreground remains for further processing. All red parts of retina including MAs, HEs and vessels are extracted in mask creation step. The

Regions of image that are likely to contain thick vessels are detected in marker creation and eventually blood vessels are discriminated from HEs and MAs in the last step using morphological reconstruction.

- **Results:** The performance of algorithm is evaluated by applying it to two fundus image databases. The first one is our database which contains the retinal images of the left and right eyes of over 100 people including healthy and different level patients. Since there is no ground-truth for our database, the results of this database were evaluated subjectively by a physician. To assess the algorithm numerically, we applied it to DRIVE database. Although the images of DRIVE database are mostly taken from healthy people, the results of this database enabled us to compare the performance of our algorithm with some other algorithms through ROC-curve.
- **Conclusions:** In this work we have presented an algorithm for vessel tree extraction in color fundus images. The algorithm is able to detect the vessel map in retinal images of patient people which contain pathological elements like MAs and HEs. To discriminate between blood vessels and MAs and HEs, we have used conditional dilation. This morphological operator needs two principal components, mask and marker. These two components are made by using Radon transform as a feature extractor. Our achieved results are comparable with other available approaches and demonstrate the high accuracy in extraction task.



The Role of Intravitreal Bevacizumab in Experimental Posterior Penetrating Eye Injury

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- **Purpose:** To investigate the usefulness of intravitreal bevacizumab in reducing complications of penetrating posterior ocular injury in an experimental rabbit model.
- **Methods:** The right eyes of 40 white New Zealand rabbits were included in a penetrating posterior ocular injury model that was consisted of a 5 mm circumferential incision placed 8 mm behind the limbus at the supratemporal quadrant. They were randomly divided into 2 groups. The rabbits in group 1 (n = 20) received 1.25 mg (0.05 ml) of intravitreal bevacizumab via pars plana injection. Group 2 (Control group, n = 20) received 0.05 ml of intravitreal balanced salt solution. On day 28, the eyes were enucleated and evaluated by gross inspection and light microscopy. Clearance time of vitreous hemorrhage, presence of fibrous proliferation or retinal detachment, greatest linear dimension of fibrosis, and grade of fibrous extension were regarded as outcome measures. Nominal variables were evaluated by the chi-square or the Fisher's exact tests; continuous variables were evaluated using the Mann-Whitney U test.
- **Results:** Average clearance time of vitreous hemorrhage was 3.42 ± 2.71 and 6.47 ± 3.58 days in bevacizumab and control groups, respectively ($p = 0.01$). The incidence of ophthalmoscopically visible fibrous proliferation was 31.6% in the bevacizumab group and 63.2% in controls ($p = 0.05$). The greatest linear dimension of fibrosis was 0.91 ± 1.14 mm in the bevacizumab group, whereas 2.00 ± 1.58 mm in the control group ($p = 0.02$). Retinal detachment rate was 11% (n = 2, all rhegmatogenous) and 21% (n = 4, 2 rhegmatogenous and 2 tractional) in bevacizumab and control groups, respectively ($p = 0.66$). Choroidal congestion, optic disc edema, and macular edema were seen in one eye (5.5%) of the bevacizumab group, while they were found in 4 (22%), 4 (22%) and 3 (16.5%) eyes of controls, respectively. These differences, however, did not reach statistical significance.
- **Conclusions:** This study showed that intravitreal injection of bevacizumab reduces the extent of fibrovascular and/or fibrocellular proliferation and accelerates the clearance of vitreous hemorrhage after an experimental model of posterior penetrating ocular injury in rabbits. These alterations may affect the long-term anatomical and/or functional success rate of posterior segment

Comparative Study of Mitomycin-C versus Bevacizumab for Preventing Bleb Failure Following Phacotrabeculectomy

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- **Purpose:** To compare the success rate of Mitomycin-C Versus bevasizumab for preventing bleb failure following phacotrabeculectomy surgery.
- **Methods:** In this randomized clinical trial 74 eyes with uncontrolled IOP and progressive VF loss with cataract were assigned in two treatment groups: 1-MMC 0.25mg/ml for three minutes applied by sponge at site of sclera flap during operation and group 2- 2.25mg/0.5ml Bevacizumab injected subconjunctival near the site of bleb at the end of surgery.
- **Results:** 74 eyes in 69 patients (4 males and 28 females) with, mean age 66.92 ± 9.81 years and 64.57 ± 8.81 years in group 1 and 2 respectively, were follow up for at least 6 months post operatively. Mean IOP in group 2 was statistically higher than group 1 (15.91 ± 4.985 vs. 12.76 ± 3.079 mmHg $P = 0.001$). Nine eyes with one antiglaucoma medication in group 1 and 3 eyes with one, 4 eyes with 2 and 2 eyes need 3 antiglaucoma medications in group 2, achieved this level of IOP. No statistically significant deference in the bleb characteristics including extension, elevation and vascularity was found in both groups ($P = 0.41, 0.93, 0.94$). One patient in group 2 needed re-trabeculectomy due to uncontrolled IOP with 3 medications. One patient in each group needed bleb revision due to poor bleb formation and elevated IOP. No adverse effect was found in any groups.
- **Conclusion:** In comparison with Bevacizumab, MMC is more effective in IOP control in patient undergoing phacotrabeculectomy. Alteration in parameters such as dose, route of application and using multiple doses may increase the effect at Bevacizumab in phacotrabeculectomy

Effect of Macular Edema on Optical Coherence Tomography Signal Strength

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- **Purpose:** The purpose of this study was to examine the effect of macular edema (ME) on Stratus optical coherence tomography (OCT) (Stratus OCT, Carl Zeiss Meditec, Dublin, CA) signal strength (SS).
- **Methods:** Part 1: Macular OCT was performed in 57 eyes with ME, at two different time points with different degrees of ME. The relationships between SS change and change in center point thickness and total macular volume in two scans were examined. Part 2: In 54 eyes with ME, Stratus OCT examinations with macular thickness mapping and retinal nerve fiber layer analysis protocols were performed. The paired values of SS obtained with two scan protocols were compared. The relationship between SS difference and center point thickness and total macular volume was evaluated between two test protocols.
- **Results:** Part 1: There was a significant correlation between SS change and the change in center point thickness and total macular volume in 2 consecutive scans. Part 2: Maximum SS obtained during macular OCT examination was significantly less than that obtained during retinal nerve fiber layer OCT. Significant correlations were observed between the difference in SS obtained in two scan protocols and center point thickness as well as total macular volume.
- **Conclusion:** Macular edema decreases macular OCT SS. In patients with ME, SS obtained during macular OCT examination was significantly lower than that obtained during retinal nerve fiber layer OCT examination.

Human Amniotic Fluid Promotes Retinal Pigmented Epithelial Cells' Trans-differentiation into Rod Photoreceptors and Retinal Ganglion Cells

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- **Purpose:** To evaluate the effect of human amniotic fluid (HAF) on retinal pigmented epithelial (RPE) cells growth and trans-differentiation into retinal neurons.
- **Methods:** RPE cells were isolated from prenatal and neonatal human cadaver eye globes and cultured in DMEM-F12 supplemented with 10% fetal bovine serum (FBS). Confluent monolayer cultures were trypsinized and passaged using FBS-containing or HAF-containing media. Amniotic fluid samples were received from pregnant women in the first trimester of gestation. Cell proliferation and cell death ELISA assays were performed to assess the effect of human amniotic fluid on RPE cell growth. Trans-differentiation into rod photoreceptors and retinal ganglion cells (RGC) was also studied using immunocytochemistry and Real Time PCR techniques.
- **Results:** Primary cultures of RPE cells were successfully established under FBS-containing or HAF-containing media leading to rapid cell growth and proliferation. When RPE cells were moved to in vitro culture system, they began to lose their differentiation markers such as pigmentation and RPE65 marker and trans-differentiated neural-like cells followed by spheroid colonies pertaining to stem/progenitor cells were morphologically detected. ICC analysis of HAF treated cultures showed a considerable expression of rhodopsin gene (30% rhodopsin positive cells) indicating trans-differentiation of RPE cells to rod photoreceptors. Real Time PCR revealed an AF-dose dependant expression of Thy-1 gene (RGC marker) and significant promoting effect of HAF on RGCs generation.
- **Conclusion:** The data presented here suggest that human amniotic fluid possess invaluable stimulatory effect on RPE cells growth and trans-differentiation into retinal neurons. It can be regarded as a newly introduced enriched supplement in serum-free kinds of media used in neuro-retinal regeneration studies.

Comparison between Three Methods of Correcting Pre-existing High Astigmatism during Phacoemulsification Surgery

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- **Purpose:** To compare the safety and efficacy of limbal relaxing incision (LRI), extended on axis incision (EOAI) and toric intraocular lenses for the correction of pre-existing corneal astigmatism at the time of phacoemulsification.
- **Methods:** In a prospective parallel cohort, multicenter study, patients having 1.5 diopter (D) or more of keratometric astigmatism were assigned to 3 surgical techniques: LRI consisting of 2 arcuate incisions straddling the steepest corneal meridian and a temporal clear corneal incision, OAI consisting of a single clear corneal cataract incision centered on the steepest corneal meridian and the extension of incision appropriate to the keratometric astigmatism, sutured if needed and then selective suture removed and Toric intraocular lenses vector were compared to assess the efficacy of treatment.
- **Results:** Sixty-two eyes of 62 patients, 10 in LRI group, 16 in EOAI group and 36 in toric IOL group were evaluated. One week postoperatively, SIA was 2.05 ± 1.03 in LRI, 0.86 ± 0.49 in EOAI and 2.23 ± 1.28 in toric IOL ($P=0.001$).
Eight weeks post operatively, SIA was 1.88 ± 0.85 in LRI, 1.45 ± 0.64 in EOAI and 2.14 ± 1.09 in toric IOL ($P=0.069$).
One week post operatively, CI was 1.16 ± 0.58 in LRI, 0.53 ± 0.31 in EOAI and 0.95 ± 0.46 in toric IOL ($P=0.003$).
Eight week post operatively, CI was 1.09 ± 0.55 in LRI, 0.85 ± 0.29 in EOAI and 0.87 ± 0.42 in toric IOL ($P=0.285$) and 1 week post operatively, IOS was -0.16 ± 0.58 in LRI, 0.47 ± 0.31 in EOAI and 0.05 ± 0.46 in toric IOL ($P=0.003$) after 8 weeks, IOS was -0.09 ± 0.55 , 0.15 ± 0.29 and 0.13 ± 0.42 , respectively ($P=0.285$).
- **Conclusion:** The amount of astigmatism reduction achieved at the intended meridian was significantly more favorable with the toric IOL at first week, but after 8 weeks, there wasn't any significant difference between groups. This study concludes that all three techniques are safe and effective in reduction of corneal astigmatism during phacoemulsification.

Outcome of Cataract Surgery in Eyes with Choroidal Coloboma

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- **Purpose:** To Evaluate Surgical Outcome of Cataract Surgery in Patients with Coloboma and Cataract
- **Methods:** A prospective study was conducted in 17 patients who had coloboma and cataract. Phacoemulsification, PCIOL, CTR insertion and pupiloplasty was done. Patients were followed for at least for 2 months.
- **Results:** Mean age was 50.12 ± 11.69 . Mean corneal diameter was 9.94 ± 1.56 mm. Mean pre operative BCVA was 1.86 ± 0.56 logMAR and 2 months post operative BCVA was 0.70 ± 0.57 log MAR ($p < 0.001$). BCVA improved in all cases. Mean pre operative cell density was 2462 ± 578 and mean 2 months post operative cell density was 1472 ± 526 ($p = 0.000$) mean pre operative coefficient of variation (CV) was 26.13 ± 7.22 and mean 2 months post operative CV was 33.72 ± 9.16 ($p = 0.136$). 14 cases had no complications and 3 cases developed vitreous loss and remained aphakic.
- **Conclusion:** The results of this case series affirm that clinically significant cataract develops at younger age in eyes with coloboma. Improved vision in this study indicates that phacoemulsification and IOL insertion could be considered safe and beneficial in these patients. For avoidance of diplopia pupiloplasty is recommended.

The Effect of Topical Umbilical Cord Serum on Improvement of Corneal Epithelial Defect Created During Diabetic Vitrectomy

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- **Purpose:** To evaluate the effect of topical umbilical cord serum on improvement of corneal epithelial defect (CED) created during diabetic vitrectomy.
- **Method:** In a randomized clinical trial, in diabetic patients that underwent deep vitrectomy for PDR and corneal edema during surgery that prompted us to remove corneal epithelium (with a 6mm trephine), the effect of topical umbilical cord serum was compared with conventional method for treatment of CED. CED size was estimated by multiplying greatest linear diameter by the meridian vertical to it after staining with fluorescein. Patients were followed daily for at least two weeks.
- **Results:** Eighty patients (55 males) were allocated in one of two treatment groups (40 patients in each group). There was statistically significant difference between cases and controls regarding the time of improvement of CED [2.4 ± 0.7 (range 2-5) days vs. 3.8 ± 2.1 (2-12) days, respectively $P < 0.001$]
- **Conclusion:** Topical umbilical cord serum has a significant effect on improvement of CED in diabetic vitrectomized patients

Rapid Assessment of Avoidable Blindness (RAAB) in Iran

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- **Purpose:** To estimate the magnitude and causes of visual impairment (VI) in people aged 50 years in Varamin province using the Rapid Assessment for Avoidable Blindness method in 2009.
- **Method:** This cross-sectional population based survey was performed in Varamin (population size: 506000) on people aged 50 years and older, using the cluster compact sampling method. Blindness was verified by WHO definition (best correction visual acuity (VA) in the better eye $< 3/60$). Severe visual impairment and visual impairment were defined as presenting $VA < 6/60$ - $3/60$ and $VA < 6/18$ - $6/60$, respectively. The cause of visual impairment was determined in each eye with $VA < 6/18$. The results were analyzed by RAAB software.
- **Result:** Among 3000 selected patients, 2819 persons (94% response rate) including 45.7% men and 54.3% women were examined. The standardized prevalence of blindness, severe visual impairment (SVI) and visual impairment (VI) were 1.33 ± 0.43 , 1.34 ± 0.55 and 6.84 ± 0.95 , respectively. The standardized prevalences of all blind, SVI and VI eyes with available correction were 4.34 ± 0.76 , 2.21 ± 0.49 and 9.63 ± 1.01 , respectively. The total avoidable causes of blindness, SVI and VI in persons were 56.1%, 65.0% and 85.5%, respectively. The principal cause of blindness and SVI in persons was cataract; although, in VI it was refractive error. Overall, the prevalence of $VA < 6/18$ with available correction in persons (in the better eye) and in each eye was 9.72% (272 persons) and 16.39% (924 eyes), respectively.
- **Conclusion:** The majority of blindness and VI was due to avoidable causes. Cataract and refractive error were the main causes in our context.

A Convenient Schirmer's Test: A Comparative Study

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- **Purpose:** Standard Schirmer's test has been considered an essential part of pre-operative evaluation of patients undergoing lid surgery. Considering that 1 minute Schirmer's test is more comfortable and practical, we assessed the results of 1-minute and 5-minute Schirmer tests (ST) when the eyes are open (STo) and closed (STc) in normal subjects and patients with dysfunctional tear syndrome (DTS).
- **Methods:** In a comparative, observational case series study, 34 normal volunteers (group 1) and 34 patients with DTS associated with Sjogren syndrome (group 2) were included in the study. STo and STc in 1 and 5 minutes time were performed separately for all subjects with an interval of at least 24 hours using Whatman No. 41 (5x 60 mm) paper with bended end of the paper inserted into the lateral side of the lower conjunctival fornix.
- **Results:** In group 1, there were 19 females and 15 males with a mean age of 20.8 years (range 18-23). In group 2 there were 29 females and 5 males with a mean age of 53.7 years (range 35-75). Mean value of STc was significantly less than STo at both 1 minute and 5 minutes in both groups. One-minute STo and STc showed a significantly less wetting than 5-minute test in both healthy patients and those with DTS. Normal distribution was observed for all the values. A significant correlation between 1-minute and 5-minute test in both STo and STc were found in the two groups. Therefore, two equations were proposed to calculate the 5-minute from 1-minute ST in each group. Statistical analysis did not provide a reliable equation for calculating the standard ST (5-minute STo) from the most comfortable state (1-minute STc).
- **Conclusions:** Faster and more comfortable ST (1-minute) is a reliable test to calculate the 5-minute ST in both open and closed eye, using the provided equations.

The Effect of Lateral Head Tilt on Ocular Astigmatic Axis

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- **Purpose:** Controversy has recently risen about the presence of compensatory ocular countertorsion (COCT) after head tilt. This study was performed to define the functional range of this phenomenon.
- **Methods:** Cycloplegic autorefractometry was performed on 80 eyes with regular astigmatism of 2D. Objective autorefractometry was performed by a high speed new generation autorefractor [Topcon, RM.8800] at normal (vertical) head position, right head tilt, and left head tilt positions of 5°, 10°, 15°, 20°, and 25°. Any change in astigmatic axis after head tilt was considered as COCT defect. The authors designed a tiltometer which was fixed over the patient's head without disturbing the proper refractometry in various head positions. The eyes had no other ocular disease except for refractive error.
- **Results:** 70 eyes completed the study process. The mean age of the patients was 26.5 ± 10 (15-48) years. The mean amplitude of COCT was $1.87^\circ \pm 1.81$ (0°- 5°) at 5°, and $6.91^\circ \pm 4.96$ (0°-20°) at 25° head tilt angles. COCT values at left head tilt were significantly lower than the COCT values at right head tilt ($P < 0.026$). Incyclotorsional compensation in one eye was not necessarily equal to the excyclotorsional compensation of the sound eye, but this torsional discrepancy was not, over all, statistically significant. ($P > 0.237$)
- **Conclusion:** COCT was found to be an unreliable phenomenon. Any minimal head tilt can induce erroneous measurement of astigmatic axis during refractometry.

Efficacy of Intravitreal Injection of Bevacizumab for Retinopathy of Prematurity

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- **Purpose:** To determine the outcome of patients with retinopathy of prematurity receiving intravitreal injection of bevacizumab for treatment.
- **Methods:** A prospective, interventional, descriptive case series was carried out on patients diagnosed with stage III retinopathy of prematurity who didn't receive any other treatment. Patients were given intravitreal injection of 0.625mg/ 0.025 ml bevacizumab and followed- up on days 1, 7, 14, 21, 28, 2 months, and monthly until 6 months. Ophthalmic evaluation for diagnosis and follow- up was done by the same ophthalmologist. Main outcome measure was regression of ROP
- **Results:** In this study we included 18 eyes (9 patients). ROP started to regress in all of the eyes during first week and continued in 16 eyes. In 2 eyes despite regression during first week, condition worsened after 10 days, so we applied laser photocoagulation for retinal periphery which caused regression of ROP.
- **Conclusion:** In this study we didn't find any systemic adverse events might question the safety of this treatment. It was also shown that injection before laser therapy can facilitate effect of laser therapy. Intravitreal bevacizumab appears to reduced neovascularization without adverse events. It is also shown in other studies intravitreal bevacizumab is effective in reducing neovascularization without adverse events, bevacizumab may, in the short term at least, be an effective treatment for ROP refractory to conventional laser ablation. The long term outcome of these patients has yet to be determined.

Comparative Study of the Effectiveness of Subconjunctival Injection of Bevacizumab (Avastin) versus Mitomycin – C (MMC) for Prevention of Bleb Failure Following Glaucoma Filtering Surgery

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- **Purpose:** To compare the success rate and safety of Mitomycin-C Versus bevacizumab in preventing bleb failure following trabeculectomy surgery.
- **Methods:** 74 eyes with uncontrolled IOP and progressive VF loss or optic disc damage randomly were assigned to two treatment groups: group 1, 39 eyes with MMC 0.25mg/ml/3 minutes applied by sponge at site of scleral flap during operation and group 2, 35 eyes with 1.25mg/0.5ml subconjunctival bevacizumab injected near the site of bleb at the end of surgery. Preoperative examination was done. There were 7 postoperative follow-up visits within 6 months of surgery: on postoperative days 1, 3, 7, 14, 30, 60, 90, and 180.
- **Results:** Mean age was 57.33 ± 10.13 years in group1 and 56.86 ± 8.91 years in group 2. The mean preoperative IOP was 29.72 ± 12.11 mmHg in group 1 and 26.97 ± 8.91 mmHg in group 2. The mean postoperative IOP in group 1 was 10.8 ± 4.57 mmHg on day 1, 9.6 ± 5.36 mmHg on day 3, 11.18 ± 4.5 mmHg on day 7, 13 ± 4.49 mmHg at 1 month, 11.59 ± 4.3 mmHg at 3 months, and 12.05 ± 3.37 mmHg at 6 months follow-up. The mean postoperative IOP in group 2 was 12.2 ± 5.1 mmHg on day 1, 9.8 ± 4.44 mmHg on day 3, 11.23 ± 4.34 mmHg on day 7, 11.09 ± 3.29 mmHg at 1 month, 11.62 ± 3.74 mmHg at 3 months, and 11.53 ± 3.66 mmHg at 6 months follow-up. There was no correlation between IOP reduction and success rate in group 1 and group 2 ($p > 0.5$). Preoperative best-corrected visual acuity in group 1 was 1.3 ± 0.88 , whereas at 6 months after trabeculectomy, it was 1.41 ± 0.88 and in group 2 it was 1.2 ± 0.83 , whereas at 6 months after trabeculectomy, it was 1.41 ± 0.88 . In group1, seven patients needed antiglaucoma medications and in group2 six patients needed antiglaucoma medications to control IOP. After a mean follow-up of 182 days, in group 1, from 39 eyes, a successful trabeculectomy with respect to IOP control was observed in 32 eyes (82.1%), with an average IOP reduction of 54.09%. In group 2, from 35 eyes, a successful trabeculectomy with respect to IOP control was observed in 29 eyes (82.9%), with an average IOP reduction of 55.31% ($P = 0.93$). No statistically significant difference in the bleb characteristics including elevation, thickness, size and vascularity was found between groups. No adverse effect was found in any group.
- **Conclusion:** In this study, 6-month outcomes suggest that subconjunctival bevacizumab is comparable to MMC as a potential adjunctive treatment for reducing the incidence of bleb failure after trabeculectomy. Alteration in parameters such as dose, route of application and using multiple doses may increase the effect at bevacizumab in phacotrabeculectomy.

Evolution of the Management of Delayed-Onset Mustard Gas Keratitis over Two Decades

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- **Purpose:** To report clinical findings and compare outcomes of different surgical techniques evolved over time in a large series of patients with delayed-onset mustard gas keratitis (MGK).
- **Methods:** The symptoms and clinical findings of patients are presented and medical and surgical interventions to address dry eye, limbal ischemia and stem cell deficiency (LSCD), and corneal involvements explained. Techniques of limbal stem cell and corneal transplantation were changed and evolved over 2 decades. These techniques (living-related conjunctival-limbal allograft [lrCLAL] versus keratolimbal allograft [KLAL] and penetrating keratoplasty [PKP] versus lamellar keratoplasty [LKP]) are compared in terms of clinical outcomes and graft survival rates.
- **Results:** A total of 175 eye of 90 cases (all male) aged between 34 and 68 years were followed up for 101 months, on average. The most common ocular involvement was chronic blepharitis and dry eye. Conjunctival vascular abnormalities and limbal ischemia were observed in 27.4% and 29.7% of eyes, respectively. LSCD necessitating stem cell transplantation developed in 41.1% of eyes. The most common corneal sign was central and peripheral anterior stromal opacity (58.9%) followed by corneal stromal thinning (36.0%) and neovascularization (27.4%). lrCLAL was performed in 32 eyes and KLAL in 40. The rejection-free graft survival rate was 39.1% in the lrCLAL group and 80.7% in the KLAL group at month 40 with a mean length of 24.9 and 68.8 months, respectively. ($P = 0.02$) Thirty eyes underwent PKP and 51 had LKP. Corneal graft failure was observed in 9 PKP and 6 LKP eyes. The rejection-free graft survival rate was 39.0% in the PKP and 90.3% in the LKP group at month 28 with a mean length of 29.6 and 85.0 months, respectively ($P < 0.001$).
- **Conclusion:** The vast majority of chemical warfare victims who have mild symptoms initially will ultimately develop significant ocular involvements requiring some sorts of surgical intervention. Limbal and corneal abnormalities can be best managed by KLAL and LKP, respectively.

Evaluation of Effect of Collagen Cross Linking on Corneal Hysteresis, Corneal Resistance Factors and Corneal Endothelial Cell in Keratoconus patients

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- **Purpose:** To assess the effect of UV-A-riboflavin corneal collagen cross linking (CXL) on corneal biomechanical and endothelial cell properties in keratoconus patients.
- **Methods:** Thirty four eyes of 23 patients aged 22.5 ± 5 (mean \pm SD) years with progressive keratoconus were treated with UV-A-riboflavin CXL. They were assessed with the ocular response analyzer (ORA) to measure corneal hysteresis (CH), corneal resistance factor (CRF), Goldmann-correlated pressure (IOPg), and corneal compensated intraocular pressure (IOPcc) preoperatively and 3 and 6 months after treatment. Endothelial cell properties were also measured by video-based noncontact specular microscope.
- **Results:** We found no significant changes in biomechanical and endothelial cell properties of the cornea following CXL after 3 and 6 months, for keratoconus as measured in vivo by ORA and specular microscope.
- Mean IOP cc and IOP g did not change significantly at 3 and 6 month after CXL compared with preoperative values.
- **Conclusion:** Our results showed lack of biomechanical corneal changes as measured with ORA parameters (CH, CRF, IOPcc and IOPg) after CXL in keratoconus .It is plausible that biomechanical changes did occur but were too subtle to be measured by ORA . The lack of evidence for endothelial cell loss shows the safety of this procedure.

Examination of the Effect of Amniotic Fluid on Transdifferentiation and Dedifferentiation of Retinal Pigment Epithelial Cells

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- **Purpose:** Retinal pigment epithelial (RPE) cells are located in the outermost layer of retina. They are capable of transforming to retinal neurons after being induced by appropriate growth factors. Analysis of protein components of amniotic fluid (AF) revealed that AF contains a variety of growth factors which are crucial for development of the fetus. Here we examined the effects of AF on human RPE cell primary cultures.
- **Methods:** RPE cells were isolated from postnatal human cadaver globes. Isolated cells were plated and grown in DMEM/F12 supplemented with 10% FBS. RPE cultures between passages 2-7 were treated with AF in culture medium and morphological changes of cells were followed up over 30 days. To investigate the manifestation of retinal neurons or progenitors in treated cultures specific markers including PKC (bipolar cell marker), CRABPI (amacrine cell marker), and Nestin (neural progenitors) were chased and the amount of the desired mRNA levels were quantified by Real-Time PCR.
- **Results:** Treating with AF culminated to a significant decrease in the number of RPE65-positive cells while PKC (bipolar cell) and CRABPI (amacrine cell) positive cells were detected in cultures. RPE cultures treated with AF began to form spheres containing both pigmented and non-pigmented cells that expressed neural progenitor markers such as Nestin. Gene expression of related mRNAs measured using Real-Time PCR demonstrated the same results as ICC and confirmed the data obtained.
- **Conclusion:** AF would be a great inducer to direct RPE cells toward retinal neurons and progenitor cells. Furthermore RPE cells displayed an appreciable capacity to produce retinal neurons, thereby providing a potential source for cell-based therapy studies in retinal degenerative diseases.

High-Density Porous Polyethylene Wedge Implant in Correction of Enophthalmos and Hypoglobus in Seeing Eyes

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- **Purpose:** To report the results of the largest case series of post traumatic enophthalmos/ hypophthalmos correction with high-density porous polyethylene (Medpor®) wedge implants in seeing eyes.
- **Methods:** A transconjunctival approach to the inferior and/or medial orbital walls was used to correct the enophthalmos/ hypophthalmos using Medpor® wedge implant. The aim was an overcorrection of 1mm in comparison to the other eye, intra-operatively. If needed, trimming of the wedge implant or adding Medpor® sheets were used to achieve the goal. Forced duction test was used to assess the need for implant fixation. Success was defined as achieving the globe position within 1mm of the other eye in the last follow-up. Improvement and failure were considered as correction outside the success range of 1 mm and no change in the amount of enophthalmos/ hypophthalmos, respectively.
- **Results:** Patients were followed for at least 6 months (mean= 12.66, SD= 12.32). Success, improvement and failure of enophthalmos correction were: 58.3% (14/24), 37.5% (9/24) and 1 (1/24, 4.2%), respectively. Success, improvement and failure of hypophthalmos correction were 73.68% (14/19), 15.78% (3/19) and 5.26% (1/19), respectively. There was no significant difference between the success rate of enophthalmos versus hypophthalmos correction ($P= 0.8$). Results of 1-month follow up change in enophthalmos// hypophthalmos was significantly correlated ($r= 0.92$, $P= 0.000$) with the last follow up change. There was no significant difference between the success rate of enophthalmos versus hypophthalmos correction ($P= 0.8$). Two patients with preoperative hypotropia needed strabismus surgery for hypertropia post-operatively and one patient developed hyperophthalmos.
- **Conclusions:** Porous polyethylene wedge implants are useful and safe in correction of enophthalmos and hypoglobus in seeing eyes. Appropriately positioned implant yields no significant difference in correction of enophthalmos versus hypophthalmos.

Knockdown of the Placental Growth Factor (PIGF) Gene Inhibits Laser-Induced Choroidal Neovascularization in a Murine Model

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- **Purpose:** To evaluate the effect of placental growth factor (PIGF) knockdown in a murine model of laser-induced choroidal neovascularization.
- **Methods:** Choroidal neovascularization was induced in the left eyes of 23 mice by infrared laser. si RNA (20picomoles/10 μ l phosphate-buffered saline [PBS]) corresponding to PIGF mRNA was administered intravitreally by Hamilton syringe in 12 mice. PBS alone was injected in 11 control eyes. One month later, fluorescein angiography was performed under anesthesia.
- **Results:** Typical CNV with prominent leakage was present in 9 of 11 control eyes (81.8%). However, no leakage was apparent in 11 treated eyes that had received si RNA cognate to PIGF ($P<0.001$).
- **Conclusion:** Knockdown of PIGF may inhibit the growth of laser-induced choroidal neovascularization in mice.

Therapeutic Effects of Sub-Tenon Methylprednisolone in Anterior Ischemic Optic Neuropathy

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- **Purpose:** No class I study has shown any benefit from medical or surgical treatment in non arthritic anterior ischemic optic neuropathy (NAION). Efficacy of systemic or intravitreal steroids was suggested by some recent studies. This study was performed to evaluate the efficacy and safety of posterior sub-tenon injection of methylprednisolone in eyes with acute NAION.
- **Methods:** 40 patients with a recent onset NAION were randomly assigned into case and control groups. The patients were selected from outpatient department of Feiz University Hospital in Esfahan, Iran during 2003-2005. The case group received a single posterior sub-tenon injection of 40 mg methylprednisolone; the control group received a sham injection. The patients underwent ocular and systemic evaluation including visual field measurement and fluorescein angiography at the beginning. Eye examination was repeated at weeks 2, 4, 6 and 8 of the follow up. Visual acuity, visual field, and optic disc edema were evaluated before and after the intervention in the case and control groups.
- **Results:** Comparison between the two groups showed relative improvement of visual acuity ($P=0.021$ at two weeks, and $P=0.05$ at 8 weeks), visual field pattern standard deviation, ($P=0.034$) and optic disc edema ($P=0.000$) in the treatment group. No case of globe perforation or severe intraocular pressure rise was detected.
- **Conclusion:** In spite of little visual recovery, posterior sub-tenon injection of methylprednisolone was preferred to observation in acute NAION.

Corneal Collagen Cross-Linking with UVA and Riboflavin in Infective Keratitis

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- **Purpose:** To evaluate the efficacy of ultraviolet corneal cross-linking (CXL) for treating infectious keratitis as adjuvant therapy.
- **Method:** Fifteen patients with infectious keratitis (six fungal, seven bacterial , and two herpetic) that were unresponsive to topical and systemic antimicrobial agents , were treated with CXL at the department of ophthalmology and ENT in Khalili Hospital of the Shiraz University of Medical Sciences .
- CXL was performed when the infection did not respond to topical and systemic antimicrobial therapy. The patients were examined until healing of corneal ulcer or until additional surgical procedures. Follow-up time after CXL treatment in response group ranged from 7-180 days.
- **Results:** In fungal cases, 3 patients showed good response to treatment (50%) one case showed no response and 2 cases deteriorated after treatment. In bacterial cases, 4 patients (57.1%) showed good response but in 3 cases no response was observed. In neurotrophic keratitis, no good response was observed after CXL therapy. Seven cases needed surgical treatment including PKP, conjunctival flap, and AMT.
- **Conclusion:** CXL is a new and promising option for treating patients with keratoconus for prevention of corneal thing progression. This treatment has been used in keratitis with good results, and may help in some corneal ulcers that are sever and not responding to medications. Some fungal ulcers (candida albicans) may deteriorate after treatment. At least 24 hours is necessary for CXL to affect and in sever corneal things, near limbal ulcers CXL has no rapid effect and is not indicated. In herpetic ulcers, CXL has no significant effect and is not recommended. In bacterial ulcers, CXL has moderately good effect but we cannot recommend it for routine use. More studies, especially double blind clinical trials are recommended for more definite evaluation of CXL efficacy in infective keratitis.

Intraocular Pressure Increasing Effect and Bioavailability of Microspherical Triamcinolone Acetonide after Intravitreal Administration in Animal Model

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- **Purpose:** To evaluate the intraocular pressure increasing effect and bioavailability of microspherical Triamcinolone acetonide (TA), as a novel drug delivery system, after intravitreal administration
- **Methods:** Microspheres loaded by TA were prepared by solvent evaporation method. After encapsulation, the final microspherical formulation was tested in an animal model. The left eyes of rabbits received microspherical TA and the right eyes were injected with conventional TA suspension. The drug concentration in the vitreous samples at days 7, 14, 28, and 56 after the injection were determined by HPLC. Intraocular pressure (IOP) was also checked at the same days with Schiotz tonometer.
- **Results:** There was no statistically significant ($P>0.05$) difference between mean concentration of microspherical TA and TA suspension in the vitreous at different sampling times except day of 56th. Mean IOP of eyes that received microspherical TA were increased less than the eyes injected with TA suspension and the difference was statistically significant ($P<0.05$) for each measurement day. TA was detectable in both eyes after 8 weeks. Both TA microsphere and suspension showed the sustained release profile.
- **Conclusion:** The results of this study showed less IOP increasing effect of microspherical triamcinolone in comparison with suspension form.

Evaluation of Heat Shock Protein 72(Hsp72), 90(Hsp90) and Heat Shock Constitute 70 (Hsc70) Expression in Limbal Stem Cells Derived Corneal Epithelial -Like Cells during Air Lifting

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Royan Institute

- **Purpose:** The heat shock proteins (HSPs) are believed to be involved in different steps of differentiation and development, in addition to adaptation to environmental stress. Although reproduction, the immune response and ageing are the processes that are most deeply affected by HSPs, the appearance and function of these proteins in corneal development or differentiation is not clear. The aim of this study is to create an ex vivo model to examine the expression of major HSP families, HSP60, 72, 90 and HSC70, at the mRNA and protein level in corneal cells differentiated from limbal stem cells following air exposure.
- **Methods:** Limbal biopsies were taken from cadaveric normal human limbus (Central Eye Bank of Iran), and were cultured as explants on amniotic membrane (AM) and plastic dish (PD). Corneal differentiation was induced by air lifting for 16 days. The expression of proposed limbal stem cells markers (P63, ABCG2), corneal markers (K3/12, Connexin43) and also HSPs (60-72-90-hsc70) were analyzed by RT-PCR, immunocytochemistry and flowcytometry pre and post air exposure, respectively. Fresh limbal and corneal tissue was used as control.
- **Results:** Air lifting induced corneal differentiation with decrease in number of P63+ cells and increase in number of K3+/CX43+ cells which characterized transient amplifying cells. Moreover denuded AM provided a superior niche for limbal SC proliferation and phenotype maintenance in vitro. We observed an increase in HSC70 and HSP72 throughout corneal differentiation and in HSP90 following air lifting. HSP60 was not detected in limbal stem cells or corneal cells in vivo and in vitro.
- **Conclusion:** These results suggest that the expression of HSPs (HSP72, HSC70 and HSP90) may play an important role in corneal differentiation/development and corneal survival.

The Influence of Different Concentrations of Bevacizumab on Matrix Metalloproteinase-2 (MMP-2) Production and Activity in Human Retinal Pigment Epithelial Cell Culture

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- **Purpose:** Matrix metalloproteinases (MMPs) are a large family of zinc-dependent endopeptidases involved in the breakdown of extracellular matrix in physiological processes, such as embryonic development and tissue remodeling, metastasis, angiogenesis etc. Thus studying this family can be useful in many aspects. In age-related macular degeneration (AMD) secretion of MMPs by retinal pigment epithelial (RPE) cells allows endothelial cells to penetrate their underlying basement membrane and eliminates the contact inhibition that normally blocks endothelial cell proliferation. Bevacizumab is a monoclonal antibody used for AMD treatment and in this study its influence on activity and quantity of MMP-2, as the main expressed MMP in RPE cell cultures, are considered.
- **Methods:** Neonatal human globes were dissected and RPE cells were isolated and cultured in DMEM: F12 (1:1) supplemented with 10% FBS. When cultures reached to 80% confluency the medium was removed and different concentrations of bevacizumab such as 0.25, 0.5 and 0.8 mg/ml were used in serum free medium. After 48 hours the medium was collected, centrifuged, concentrated and assessed for MMP-2 by zymography, western blot and slot blot analysis. RPE RNA was also extracted and reversely transcribed using Qiagen cDNA synthesis kit and subjected to amplification by Real-Time PCR.
- **Results:** Zymography and slot blot determined that as bevacizumab concentration increased gelatinolytic activity and secretion of MMP-2 in drug-treated cultures increased too. Also, on the basis of Real-Time PCR results, MMP-2 transcription increased.
- **Conclusion:** MMP-2 is an extracellular matrix degradative enzyme that has a major role in cellular processes such as proliferation, differentiation and migration; therefore, an increase in its quantity or activity can cause morphogenesis and angiogenesis. Thus according to the aforementioned information that obviously has revealed an inductive effect of bevacizumab on MMP-2, application of this drug for AMD needs more investigation.

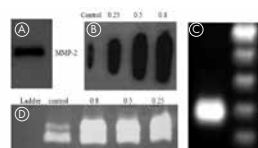


Figure. (A) Western Blot. (B) Slot Blot. (c) Gel Electrophoresis of Real-Time PCR. (D) Zymography

The Relationship between Central Corneal Thickness, Intra ocular Pressure (IOP) and Visual Field Defect in Primary Open-Angle Glaucoma and Normal Tension Glaucoma

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- **Purpose:** Glaucoma is one of the most important causes of legal blindness. Accurate determination of intra ocular pressure (IOP) is important for diagnosis and decision about treatment of glaucoma. Since central corneal thickness (CCT) is propounded as an effective factor on IOP and visual field defect (VFD) this study was designed to evaluate the relationship between CCT, IOP and visual field in normal tension glaucoma (NTG) and primary open angle glaucoma (POAG).
- **Methods:** In this study, 45 eyes with NTG and 45 eyes with POAG were selected from glaucoma patients that they referred to AL-Zahra Ophthalmology Hospital. Their IOP and CCT were measured by Goldman tonometer and pachymeter and visual field examined by Humphrey perimeter.
- **Results:** The results showed that there was significant correlation between CCT and IOP ($r=0.309$, $p=0.003$). Also, there was a significant difference in IOP between two types of glaucoma ($p=0$). Mean value of CCT in patient with mild VFD was higher than severe VFD but lacked statistical relationship ($p=0.127$).
- **Conclusion:** Central corneal thickness (CCT) and intraocular pressure (IOP) have significant linear correlation, but there isn't significant relationship between CCT and visual field defect in open angle glaucoma and normal tension glaucoma

Comparison of Rose-K and Conventional RGP Contact Lens in Management of Keratoconus

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- **Purpose:** There are different therapeutic modalities in the treatment of keratoconus patients. RGP contact lenses are a common modality for rehabilitation of these patients. Different designs of these contact lenses are available. This study is designed to compare Rose-K contact lenses (a keratoconus specific design) with conventional RGP lenses (such as Wohlk rigid contact lens).
- **Methods:** 54 patients with keratoconus were randomly divided to 2 study groups and fitted with either Rose-K or Wohlk contact lenses by an experienced ophthalmologist with a standard (three touch point) approach. General and demographic information, KR values, far and near visual acuity with and without contact lenses, daily contact lens wearing time, daily need for lens removal, patient comfort with contact lens, and visual function score (based on VFQ-25, a questionnaire of visual function) at the beginning and follow up visits were measured and evaluated by statistical tests.
- **Results:** Both Rose-K and conventional RGP (Wohlk) lenses improved far and near visual acuity in all patients, and there was no statistically significant difference between two groups ($p=0.88$). Daily contact lens wearing time and patients conformance with lenses was more in Rose-K group ($p=0.0001$). Daily need for lens removal was almost equal in two groups (mean=1.4 hr, $p=0.832$). There was significant improvement in visual function in all patients with usage of contact lenses, but no statistically significant difference was found between two groups ($p=0.452$).
- **Conclusion:** Rose-K lenses are one of the good therapeutic modalities in rehabilitation of keratoconus patients that improve visual acuity and function in patients, and produce more conformances for them in comparison with other conventional RGP contact lenses.

Mechanical versus Alcohol Assisted Epithelial Debridement for Photorefractive Keratectomy

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- **Purpose:** to compare between two methods of corneal epithelial debridement in photorefractive keratectomy (PRK), mechanical debridement and 20% ethanol
- **Methods:** 66 eyes from 33 patient with myopia - 4 diopter and astigmatism 1 diopter were included and randomized in 2 groups (mechanical debridement or 20% ethanol for 20 second) and underwent PRK. The groups were compared for epithelial debridement time, epithelial defect healing time, UCVA, BCVA, refractive error state, post surgical corneal haze, corneal epithelial thickness, stromal keratocyte count and endothelial cell count in 6 month follow up period.
- **Results:** The mean age \pm standard deviation (SD) of participants was 26.1 ± 5.5 years (median: 24, range: 20 to 41). Twenty (58.8%) were male. Twenty three of right eyes (69.7%) were randomly assigned to the manual group.

The mean time of debridement \pm SD was 74.3 ± 51.2 seconds in mechanical group, and 26.2 ± 15.6 seconds in alcohol assisted group which was statistically significant ($p<0.001$).

The mean healing time \pm SD in mechanical group was 3.24 ± 0.43 days, and in alcohol assisted it was 3.06 ± 0.32 which was statistically significant ($p<0.001$).

After 6 month there was no statistically significant difference between 2 groups in BCVA ($p= 0.325$) UCVA ($p= 0.107$), epithelial thickness ($p= 0.48$), endothelial cell count ($p= 0.257$) post surgical corneal haze ($p>0.99$).

- **Conclusion:** As mentioned in the results, use of diluted ethanol for corneal epithelial debridement in PRK was associated with significant decrease in debridement time and epithelial defect healing time without noticeable toxic effect on corneal keratocytes and endothelium. Thus, use of 20% ethanol for 20 seconds for epithelial debridement in PRK is a safe and effective method.

2

**POSTER
PRESENTATIONS**

Basic Sciences

Evaluation of the Prevalence of MYOC Gene Polymorphisms in Khatam-Al-Anbia Glaucoma Eye Center

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- **Purpose:** The aim of this study was to indicate or rule out the disease causing role of the MYOC gene mutations by screening patients in Khorasan district for its mutations.
- **Methods:** In a case-control study, 70 patients with primary open angle glaucoma and 70 healthy blood donors were enrolled. We used PCR-SSCP method to distinguish variability sequences in 3 exons of myocilin gene. Clinical picture of the disease including visual acuity, cup to disc ratio and intra-ocular pressure was compared between wild and variant SSCP groups
- **Results:** 75.1% of patients were male and 24.9% were female. The average age was 56.7 ± 27.2 years in patient and 18.6 ± 6.9 years in healthy groups. There was a statistically significant difference in the prevalence of SSCP changes between patients and healthy controls (40% vs. 11.5%, $p < 0.001$). These differences were significantly higher in exon 1 and 3 in the patient group (15.7% vs. 0% $p=0.001$ and 11.5% vs. 2.8%, $p=0.049$, respectively). Clinical picture of the disease was not related to the presence of SSCP changes.
- **Conclusion:** Mutations of MYOC gene are more prevalent in Iranian patients than other populations. Our results of PCR-SSCP should be confirmed by gene sequencing in selected patients who had different SSCP results

No Evidence of HPV Infection in Ocular Surface Neoplasia: A PCR-Based Study

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- **Purpose:** To investigate the association between HPV infection and ocular surface squamous neoplasia (OSSN).
- **Methods:** Forty pathological specimens including 20 conjunctival intra-epithelial neoplasia grade I, 20 conjunctival intra-epithelial neoplasia grade III and invasive squamous cell carcinoma as well as 20 pterygium samples (as control) were analyzed by polymerase chain reaction (PCR) to find any evidence of HPV infection. The examinations were done on cut sections from paraffin embedded tissue blocks of our laboratory archive.
- **Results:** The samples of the CIN I group had been obtained from patients whose ages ranged from 30 to 86 years (mean 56 ± 8), comprising 10 female and 10 male patients.

In CIN III and SCC group the age of patients ranged from 43 to 82 years (mean 61.7 ± 9) comprising 9 female and 11 male patients.

Twenty samples of pterygium (as the control group) belonged to patients with age ranging from 24 to 67 years (mean 41.5 ± 10) including 13 female and 7 male patients.

All cases and controls were negative for HPV.
- **Conclusion:** In our study, there was no association between HPV infection and ocular surface neoplasia.

The Gender Issue in Congenital Cataract Care

Katibeh M, Eskandari A, Sehat M, Ziaei H, Javadi MA

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences

- **Purpose:** To investigate the presence of gender inequality in the care for congenital cataract.
- **Methods:** In a cross-sectional study we compared age at operation, according to gender, in all consecutive cases of congenital cataract between 2006 and 2009, in a referral hospital.
- **Results:** There were 276 cases (220 unilateral and 56 bilateral). Mean age at operation was 4.07 ± 7.51 and 4.73 ± 7.40 years in girls ($n=122$, 44.2%) and boys ($n=154$, 54.8%), respectively ($p=0.46$). Girls with bilateral disease presented significantly later than boys (5.04 yrs vs. 2.21 yrs, $p=0.021$).
- **Conclusion:** Consistent with other studies, in our setting girls with bilateral condition fall victim to gender inequality.

Iranian International Ophthalmologic Papers during the Last Three Decades

Katibeh M, Moein HR, Javadi MA, Ziaei H

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- **Purpose:** The number of scientific publications plays an important role in assessment of scientific progress. The objective of this study was to assess the number of published papers in the international peer-reviewed journals from Iranian ophthalmic institutes during the last 30 years and compare it with other developing and developed countries.
- **Method:** As the best source for indexing international valid and peer-reviewed journals, Pubmed website was searched by two researchers independently. Using advance search option and Boolean logic (AND/OR), we looked for the articles with the keywords "ophthalmology", or "ophthalmic" or "eye" and the name of each country in their affiliation field. We limited our search results to 30 years (from the beginning of 1980 to the end of 2009) and then we searched again the same data in each decade separately.
- **Result:** Total indexed papers from the ophthalmic institutions during 30 years, were 111835 articles. Iran had 361 publications during this period consisting of 0, 19 and 342 articles in the first, second and third decade, respectively. Among the developing countries India with 2510 publications was in the first place followed by Turkey with 2216 articles. In this period of time, United Arab Emirate, Egypt and Saudi Arabia published 10, 129 and 665 articles, respectively. In the developed world, the United States of America topped the list with 31375 articles (28.05% of total papers) followed by Japan (10979), Germany (4115), Canada (2081), Switzerland (1170), England (1150) and France (762).
- **Conclusion:** Although the number of Iranian ophthalmologic publications in the international peer-reviewed journals rose significantly (342 times) during the last 30 years, more emphasis on ophthalmologic researches is warranted to achieve better results. In order to gain a better rank in the world, we need to extend and improve scientific thinking among our medical care workers; this requires great effort from our ophthalmologists and research centers.

Use of a Phacoemulsification Simulator for Training Ophthalmology Residents at Shahid Beheshti University of Medical Sciences

Katibeh M, Eskandari A, Sehat M, Ziaei H, Javadi MA,

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences

- **Purpose:** To study the effects of using a phacoemulsification virtual simulator on the training of ophthalmology residents in Shahid Beheshti University of Medical Sciences
- **Methods:** A Health Technology Assessment (HTA) was conducted that covered two main domains of technical aspect and effectiveness and efficacy. A review of the literature was used to identify suitable tools for collecting and measuring data in the mentioned domains. We designed a multiple choice questionnaire addressed to users and administrators of the simulator training whose validity was verified by expert opinion. Additionally, we conducted several deep interviews with users, executors, managers and stakeholders. Technical parameters of the simulator were assessed by determining its face and construct validity as a score out of 100. Scores were given by 19 novice residents and 4 experienced fellowship candidates. These parameters were also tested by two researchers and the memory was reviewed in the presence of the technician in charge of the simulator to ascertain that no data were missed.
- **Results:** The EYESI simulator manufactured by VRMAGIC Company (Manheim, Germany) consists of a user interface an eye model, a foot pedal, microscope control pedals and various surgical forceps. Residents gave a score of 85.08 for its face validity and a 70.87 for its construct validity. Fellowship candidates scored its face and construct validity at 60 and 80.66, respectively. 63.2% of residents believed that the simulator is a very useful training option and 75% of fellowships viewed it as useful. Eighty percent of interviewed attending believed that the simulator decreased the time required for training and increased its quality. They also stated that residents who were trained with the simulator were adequately prepared for entering the OR and showed better eye hand coordination. All the stakeholders strongly believed that simulation is a necessary method of education.
- **Conclusion:** The EYESI simulator is an up-to-date virtual reality medium that enjoys good face and construct and face validity. It was also shown to be an effective method of training since it decreased time and increased quality of training. While we recommend integration of this state of the art method in the academic curriculum of ophthalmology in our country we recognize the need for further studies that address its cost-effectiveness and safety.

A Cost Study of Two Treatment Modalities for Patients with Ocular Toxoplasmosis

Katibeh M, Soheilian M, Azimzadeh A, Sadoughi M,

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- **Purpose:** to examine the treatment costs of two modalities for patients with ocular toxoplasmosis.
- **Method:** In a clinical trial we compared direct and indirect treatment costs (transport and productivity loss using opportunity approach) from a patient perspective. The prices were indexed to 2009 prices.
- **Result:** Sixty-eight patients were randomly assigned to IVCD (intravitreal clindamycin + dexamethasone) or CT (classic treatment) groups. The average costs, per patient, in IVCT and CT groups were US\$369.9 and US\$284.2, respectively.
- **Conclusion:** Although classic treatment has lower costs compared to IVCD, final decision depends on a full cost effectiveness evaluation considering clinical outcomes and quality of life.

Assessing the Information Management Needs of an Ophthalmology Department and Development of a Comprehensive Database: A Health System Research (HSR)

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Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences

- **Purpose:** Design and installation of data management software for the research projects of The Ophthalmic Research Center and Department of Ophthalmology in Shahid Beheshti University for collection and presentation of scientific-research data in the field of ophthalmology
- **Methods:** The following steps were undertaken to implement the current project:
 1. A comprehensive search to find the best fitting format for curriculum vitae that meets both local and international needs
 1. Conducting focus group discussions and deep interviews with stakeholders and researchers to access the most appropriate analysis
 1. Analysis and edition of all software outputs according to the needs of universities, miniseries, WHO and other international organizational and local and international research centers
 1. Design and development of software according to aforementioned objectives
 1. Design of required forms and workflow
 1. Design of reports
 1. Design of the initial draft of the software
 1. Production and coding
 2. Debugging and final testing
- **Results:** After analysis and provision of desired hardware and software facilities the comprehensive research projects, researchers and reviewers database software was designed and installed. This software enjoys the following features:
 - Management and follow up of ongoing research
 - Archiving completed research
 - Forms related to conduct and progress of research projects
 - Managerial reports regarding projects

Presently, more than ten years of scientific and research activities of the ophthalmology department and research center are entered in the software that will be tested and debugged for an entire year.
- **Conclusion:** The possibility of developing a nationwide database for researchers, reviewers and projects in the field of ophthalmology will be realized if the support of managers and stakeholders enables the extension of the present software to other ophthalmology research centers and departments. Additionally, we hope that other medical axes of our country will be inspired by the present project and undertake steps to collect, classify and report scientific and research reports in various medical fields.

Inequity in Blindness and Low Vision among the Elderly in the Suburb of Tehran Metropolis (Varamin)

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Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences

- **Purpose:** The prevalence of blindness and low vision varies in different communities. Prevalence of blindness and low vision ranges from 0.2-1 percent and 1.1-3 percent, respectively in different WHO regions. On the other hand, disability accompanies poverty and between 15 to 20 percent of the poor living in developing countries suffers from some form of disability. Studies on the influence of blindness and low vision on life expectancy have shown that blindness is the sixth factor among seven factors of disability. Poverty can be a direct cause for blindness (trachoma) and blindness and poverty can cause financial problems and social isolation even in developed countries. Blindness and low vision can impose enormous financial burden on nations through direct cost of treatment and decreased productivity. Consequently, it is possible to fight poverty by preventing blindness. Despite the role of social and economic factors on blindness and low vision, these issues have not been studied extensively. Marginal areas of metropolitans are known as at risk area. A couple of socio economic determinants can impact on eye health we will try to study the impact of social justice and its related factors on health indicators. In this study we attempt to identify the prevalence of blindness and low vision and their causes and hence clarify the role of social and economical factors. To study blindness from preventable causes (receiving preventive services and care) we selected the population over 50 years old as the case group. This age group represents a good sample due to a stable capital status and socioeconomic level. By identifying the distribution of blindness in different income levels we will be able to target vulnerable groups in the territory and design the most appropriate supportive and preventive programs to reduce the burden of the disease.
- **Method:** We use a two-part questionnaire to collect data. All the members of the teams were trained. The first part of the questionnaire includes optometric and ophthalmic examinations and the second part of the questionnaire comprises data regarding the socioeconomic status of the families. Content and face validity of the questionnaire is verified through literature review and expert opinion of a public health specialist, an epidemiologist and a health economy specialist. Internal consistency is checked by Cronbach's alpha at the level of 0.8. At the final part of the questionnaire socioeconomic status is addressed through inquiry about family asset and not income. The suitable combination of social and economic factors influencing eye health will be determined through component analysis. Data analysis includes a description of the prevalence of visual impairment in different deciles of income and socioeconomic status. Subsequently, equity indices including Concentration Index.
- **Results:** 2819 persons over 50 participated for ophthalmic examination. 1548 persons (54.9%) were female. Total Response rate was 97.1%, for males and female separately,

it was 97.0% and 97.2%, respectively. Non-participants were not significantly different. Age average was 60.9 years with women slightly younger (60.1 vs. 61.8). Participants were divided in three groups based on such socioeconomic factors as education, occupation, use of communication technologies, immigration status and asset. Unilateral blindness, as defined by WHO (visual acuity < 3/60), was twice more common in lower compared to higher socioeconomic status (SES) (7.3% vs. 2.9%; $p < 0.000$). The same is true for low vision in the better eye. Prevalence of bilateral blindness, based on available visual acuity, was 1.4% in low SES as opposed to 1.1% in high SES; however, the difference was not significant ($p = 0.373$). Frequency of curable causes of blindness, including refractive errors, untreated cataract and aphakia, was 9.4% and 3.2% in the low and high SES groups, respectively. The group with higher SES had better cataract surgery coverage rate (85.9% vs. 76.9%). Frequency of blindness was significantly higher in ethnic minorities like Turks, Kurds and Lurs ($p = 0.003$).

- **Conclusion:** Unilateral low vision and blindness was significantly lower in groups with lower SES. This difference is less tangible cases of bilateral blindness but lack of proper planning in this regard might accentuate bilateral cases. Higher frequency of visual impairment in ethnic minorities, the less educated and weaker financial power highlights them as vulnerable groups that warrants detailed planning for prevention.

The Origin of Visual Evoked Potential P100 Peak

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- **Purpose:** The aim of this study is to find out the origin of VEP, P100 which would help the clinicians in better and more accurate diagnosis.
- **Methods:** A total of 150 patients recruited during 2008-2009 for a randomized clinical study were divided into 3 groups. Each group had 50 members. The first group consisted of asymptomatic patients with normal routine clinical ophthalmologic examination. The second group was selected from patients with corneal opacity and the third group was selected from multiple sclerosis (MS) patients. VEP was recorded in all group members. Latency and amplitude of P100 peaks were measured for each subject. A suitable statistical software was used to analysis the results.
- **Results:** Normal values of latency and amplitude were obtained from control group. In patients with corneal opacity there was a fall in the mean amplitude of P100 peak and in MS group patients we observed a delay in the mean latency of P100 peak in comparison with the normal group.
- **Conclusions:** Considering reduction in visual acuity in patients with corneal opacity and demyelination of optic nerve in MS patients, one can conclude that the origin of P100 amplitude is the visual acuity and that of latency is the myelin of the optic nerve.

Orbital Hydatid Cyst: Clinicopathologic Study of Five Cases

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- **Purpose:** To report five cases of polycystic Echinococcosis of the orbit caused by *Echinococcus granulosus*
- **Method:** Clinical, imaging and histopathologic studies of five patients with a cystic lesion in the orbital space, which was later diagnosed as orbital Echinococcosis, in our center between 2001 and 2009 were reviewed.
- **Results:** In all of the patients, cystic lesions were removed completely during an orbitotomy approaches that best suited each patient (two transcranial, two medial and one lateral orbitotomy). Leakage of fluid was seen in 4 of the patients during surgery which was managed with irrigation of the site of operation with hypertonic saline solution. Histopathologic confirmation of hydatid cyst was made in all of the patients. Three of the patients were treated with albendazole (10mg/KG twice a day for 12 wk) after the surgery.
- **Conclusion:** Hydatid cyst should be considered in the differential diagnosis of unilocular and multicystic lesions of the orbit. The cyst can be intraconal or extraconal. Proptosis was the most prevalent symptom in our series. Complete removal of the cyst is curative in almost all cases.

3

POSTER PRESENTATIONS

Anterior Segment

Cross Cylinder Lasik for High Astigmatism

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- **Purpose:** To evaluate visual outcomes of cross-cylinder laser in situ keratomileusis (Lasik) in eyes with high astigmatic refractive errors with a low spherical component.
- **Methods:** We prospectively evaluated cross cylinder Lasik in patients with high astigmatic eyes with a low spherical component over a period of 2 years. All laser surgeries were performed with Nidek ec-5000 excimer laser. Main outcome measures were uncorrected visual acuity (UCVA), best spectacle-corrected visual acuity (BSCVA), manifest refraction, and complications.
- **Results:** Thirty-four eyes of 22 patients were included. Patients were followed for 21.8 ± 3.6 months. At the last examination, UCVA of 20/40 or better was observed in 33 eyes (97.1%). The BSCVA after Lasik improved significantly in comparison to BSCVA before the surgery ($p < 0.005$). The mean preoperative cylinder was -4.73 ± 0.89 d (-4.00 to -7.00 d) which decreased to -0.29 ± 0.47 d (0.00 to -1.50 d) at the last follow up visit ($p < 0.001$). No cases of postoperative astigmatic regression or corneal haze were observed.
- **Conclusion:** Cross cylinder Lasik with the Nidek ec-5000 is a successful procedure for correction of high astigmatism and improving vision. It seems to be clinically safe, effective and predictable.

Evaluation of the efficacy of Subconjunctival Bevacizumab (Avastin) in Eliminating Corneal Neovascularization in a Rabbit Model

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- **Purpose:** To evaluate the effect of subconjunctival Bevacizumab in eliminating experimentally induced corneal neovascularization in rabbits
- **Methods:** In this study, chemical burn was induced in the right eyes of twenty New Zealand albino rabbits using 4% (1 molar) NaOH solution. Neovascularization was graded using a slit lamp biomicroscope nine days later.
- Rabbits were assigned to control or a case group by chance 0.1 ml of subconjunctival distilled water was injected to the right eye in the control group. Similarly, 0.1 ml (2.5 mg) of subconjunctival Bevacizumab was injected in the case group. Neovascular fronds were graded again after three and 10 days. Data was collected and analyzed by Mann-Whitney u & Friedman statistical tests.
- **Results:** In Mann-Whitney u test, the difference between two groups, immediately before Bevacizumab injection was not meaningful ($P\text{-Value} = 0.374$); however, it was significant 3 and 10 days after injection ($P\text{-Value} < 0.0001$), indicating a reduction in the degree of corneal neovascularization in the case group, as time passes.
- **Conclusion:** With pass of time in the ten days period in this study, the effect of Bevacizumab became more evident. Nevertheless, larger animal and in vivo studies are needed to more exactly determine the therapeutic effects of Bevacizumab.

Conjunctival-Limbal Autograft for Unilateral Total Limbal Stem Cell Deficiency

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- **Purpose:** Evaluation of surgical results and visual outcomes of conjunctival-limbal autograft (clau) in patients with unilateral total limbal stem cell deficiency (lscd) with special emphasis on surgical difficulties, complications, and their management.
- **Methods:** Conjunctival-limbal autograft combined with amniotic membrane transplantation as a graft was performed on chemically or thermally injured eyes. Penetrating keratoplasty (PKP) was performed on eyes with dense corneal opacification. Visual acuity, corneal transparency and vascularization, and complications were recorded.
- **Results:** The patients were followed for 16.27 ± 7.03 (6 to 34) months. Optical pkp was performed on 18 eyes. The best spectacle-corrected visual acuity was -2.28 ± 0.45 LogMAR before clau which improved to -0.64 ± 0.52 LogMAR and -0.35 ± 0.13 LogMAR at the last follow-up in eyes with and without pkp, respectively. Corneal transparency and vascularization, which were graded as 4+ before surgery, improved to a mean of 1.7 ± 0.8 and 2.1 ± 0.7 three months after surgery. Mean epithelial healing time was 8.8 ± 4.1 (5 to 20) days. Longer healing occurred in 5 eyes due to small lenticules (n=2), exposure (n=2), and conjunctival encroachment (n=1). Mean healing period of epithelial defect over pkp was 8.8 ± 5.5 (4 to 14) days. Persistent epithelial defect occurred in 8 cases with cut lenticules (n=2), small-size lenticules (n=2), and chronic exposure (n=4). Lenticule-related complications were thick lenticules (n=4), conjunctival mantle encroachment (n=2), dislodging (n=4), progressive thinning (n=2), small size (n=3), and accidental trephination (n=2).
- **Conclusion:** Clau combined with amt with or without pkp is effective in anatomical and visual rehabilitation of the eyes with unilateral total lscd. This surgery increases corneal transparency and decreases vascularization. The lenticules should be handled carefully in order to avoid most common lenticule-related complications.

Midterm Outcomes of Autologous Cultivated Limbal Stem Cell Transplantation with or without Penetrating Keratoplasty

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- **Purpose:** To report the midterm outcomes of autologous limbal stem cell transplantation cultivated on amniotic membrane (am) with or without subsequent penetrating keratoplasty (pkp) in patients with total unilateral limbal stem cell deficiency (lscd).
- **Methods:** Eight eyes of 8 consecutive patients with unilateral total lscd underwent autologous limbal stem cell transplantation cultivated on am. Four eyes underwent subsequent optical pkp. Main outcome measures were corneal vascularization and transparency.
- **Results:** The patients were followed for 34.0 ± 13.5 months (6 to 48). Seven cases had a stable corneal epithelium with marked decrease in opacification and vascularization. Progressive sectorial conjunctivalization was evident in all cases with subsequent pkp at the last follow-up. Primary failure was observed in one case due to exposure.
- **Conclusion:** Transplantation of autologous stem cells cultivated on am with or without subsequent pkp seems to be an effective way of visual rehabilitation in total lscd. More work with more cases and longer follow up are needed to optimize this procedure in order to provide and maintain an adequate supply of limbal stem cells in these patients.

Effects of Hydrodynamic Parameters on Corneal Endothelial Cell Loss after Phacoemulsification

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- **Purpose:** To evaluate the effect of power, vacuum and flow rate on endothelial cell loss after phacoemulsification.
- **Methods:** In a prospective randomized clinical trial, phacoemulsification was performed on two equal groups (high and low vacuum) of 60 eyes of 60 patients with moderate lens opacity (nuclear sclerosis 3+). All surgeries were performed using stop and chop technique with the sovereign machine. The machine parameters during chop stage in high and low vacuum groups were; vacuum: 400, 200 mmHg, and flow rate: 40, 20 cc/min, respectively. Phaco time, average and total ultrasound energy, and fluid volume were recorded. Endothelial cell density before and 1, 6, and 12 weeks after surgery were compared.
- **Results:** The mean ultrasound power was $9.2 \pm 4.3\%$ and $13.1 \pm 4.6\%$ in low and high vacuum groups, respectively ($p=0.001$). The mean phaco times were 1.28 ± 1.0 minutes and 0.88 ± 0.6 minutes in low and high vacuum groups, respectively ($p=0.04$). Total ultrasound energy and total fluid consumed during phacoemulsification was similar in two groups. After 12 weeks, the mean endothelial cell loss was $9.0 \pm 4.0\%$ and $9.6 \pm 4.6\%$ in low and high vacuum groups, respectively ($p=0.6$). There was a relation between total ultrasound energy and endothelial cell loss ($p < 0.001$), but total fluid volume used was not a significant predictor ($p=0.19$).
- **Conclusions:** Choice of vacuum does not have any significant effect on total ultrasound energy and total fluid consumed during phacoemulsification. There is a strong relation between total ultrasound energy and endothelial cell loss. However, there is no relation between total infused fluid and endothelial cell loss.

Keratolimbal Allograft in Total Limbal Stem Cell Deficiency

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- **Purpose:** To investigate the outcome of keratolimbal allograft (KLAL) for treatment of total limbal stem cell deficiency (TSCD)
- **Method:** Patients with total limbal stem cell deficiency and adequate tear production were included. A total of 27 KLALs were performed in 21 eyes of 20 patients with TSCD. Immunosuppression was done using mycophenolate and cyclosporine. Improvement of vision, KLAL survival and post operative complications were studied.
- **Results:** Mean follow up was 22.14 ± 11.83 months (6-39 months). Mean visual acuity improved from 2.53 ± 0.21 LogMAR to 1.49 ± 0.77 LogMAR ($p=0.0000$). 6 KLALs never re-epithelialized and were considered primary failure. Mean survival of KLAL was 14.23 ± 1.5 months. Graft survival rate was 61.9% at 1 year and 31% at 20 months. Complications were, corneal ulcer in 6, glaucoma in 2 and sclera thinning in 1 case.
- **Conclusion:** Keratolimbal allograft surgery is successful during short term follow up in visual rehabilitation of patients with total limbal stem cell deficiency. For a definitive conclusion long term follow up is necessary.

Limbal stem cell deficiency in chronic and delayed-onset mustard gas keratopathy

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- **Purpose:** To evaluate limbal stem cell deficiency (LSCD) using impression cytology in patients with chronic and delayed-onset mustard gas keratopathy (MGK). Prospective observational case series. Thirty-five eyes of 18 patients (all male) with MGK were included.
- **Methods:** A consecutive series of patients with MGK underwent impression cytology. Finding of goblet cells on the corneal side of specimens was considered as LSCD. Severity of corneal clinical manifestation was graded as mild, moderate, and severe in each quadrant. Relation between impression cytology findings and clinical grading was evaluated. Impression cytology findings and clinical grading.
- **Results:** There was LSCD in at least 1 quadrant of cornea in all 35 eyes (100% of cases). No differences were found between impression cytology findings (positive vs. negative for corneal goblet cells) among different quadrants ($P = 0.378$). Clinical grading was the same between nasal and temporal quadrants ($P = 0.266$) and between superior and inferior quadrants ($P = 0.263$). By combining superior and inferior quadrants (vertical zone) and nasal and temporal quadrants (horizontal zone), corneal clinical grading was more severe in horizontal versus vertical zones ($P < 0.001$). There was no relation between LSCD and corneal clinical severity ($P = 0.893$).
- **Conclusions:** A varying degree of LSCD was demonstrated in all patients with chronic or delayed-onset MGK using impression cytology. Corneal clinical manifestations are more severe in nasal and temporal quadrants. There was no relation between impression cytology findings (positive vs. negative for goblet cells) and corneal clinical grading. Other factors, such as perilimbal conjunctival ischemia, may play a role.

Comparison of Spherical and Aspherical Intraocular Hydrophilic Lenses on Contrast Sensitivity and Visual Acuity after Cataract Surgery

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- **Purpose:** To compare contrast sensitivity after phacoemulsification with aspheric and spheric hydrophilic IOL installation.
- **Methods:** Forty seven uncomplicated pseudophakic patients were randomly divided into two groups. After installation of aspheric and spheric hydrophilic IOLs, contrast sensitivity and visual acuity were checked in four different condition (Photopic, Mesopic, Photopic with glare and Mesopic with glare).
- **Results:** Mean age was 57.51 ± 9.05 years. Sixty percent of patients were male and were mostly normal staff with moderate educational level. The most common problem after operation was glare and halo formation. But most of them were satisfied with their new condition. Mean contrast sensitivity level on different frequency levels (0.5, 1, 2, 10 & 20) in both groups was statistically similar. Repeating the test in different conditions such as photopic, mesopic, photopic with glare and mesopic with glare yielded similar results.
- **Conclusion:** Based on results of this study cataract surgery with IOL installation will increase visual acuity and contract sensitivity markedly regardless of IOL type.

Histopathologic Evaluation of Trabeculectomy Specimens and Surgical Results in Patients with Chronic Primary Glaucoma

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- **Purpose:** To evaluate the histopathologic features of trabeculectomy specimens and the results of trabeculectomy in relation with these features in patients with chronic primary glaucoma.
- **Methods:** This interventional case series included 30 eyes of 28 patients with primary chronic glaucoma who underwent trabeculectomy between 2004 and 2006. Each case was followed for 6 months postoperatively. Histopathologic features and results of surgery were evaluated. The surgery was considered successful when resulted in intraocular pressure (IOP) of <21 mmHg without antiglaucoma medications and failed when resulted in IOP of >21 mmHg despite using antiglaucoma agents.
- **Results:** Mean age of patients was $59 \pm SD$ (range 20 to 90) years and 18 patients (64.3%) were male. Seventeen patients had chronic primary open angle glaucoma and 11 had primary chronic closed angle glaucoma. The operation was performed as fornix-based method in 16 eyes and limbal-based in 14. The surgery was successful in 26 (86.7%) and failed in 4 (13.3%). The content of trabeculectomy specimens in the successful cases included trabecular meshwork in 15 (57.7%), only scleral in 6 (23.1%) and only corneal tissue in 5 (19.2%) cases. Out of 15 cases with content of trabecular meshwork, 7 cases (26.9% of successful cases) had all three portions of cornea, trabecular meshwork and sclera. This figure was not observed in any failed cases. The content of trabeculectomy specimens in failed cases included trabecular meshwork in 3 cases and only sclera in one case.
- **Conclusion:** The size and position of the site of trabeculectomy is variable and seems to have significant effects on the success rate of the surgery such that surgical resection anterior to the scleral spur increases the chance of surgical success.

Central Corneal Thickness Changes after Congenital Cataract Surgery

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- **Purpose:** To evaluate central corneal thickness (CCT) changes after congenital cataract surgery with or without intraocular lens (IOL) implantation.
- **Methods:** Forty-seven eyes of 30 patients with congenital cataracts were included in this prospective interventional case series. Of these, seventeen patients had bilateral cataracts. Anterior lensectomy and anterior vitrectomy was performed in all cases. IOL was implanted in 32 eyes (pseudophakic group), while 15 eyes remained aphakic (aphakic group). CCT and IOP measurements were performed in all cases before cataract surgery as well as one and six months postoperatively. A group of age-matched normal subjects were considered as controls (control group).
- **Results:** The mean baseline (preoperative) $CCT \pm SD$ in pseudophakic, aphakic and control groups was $540 \mu m \pm 34$, $548 \mu m \pm 61$ and $558 \mu m \pm 36$, respectively ($p=0.207$). One month after the operation, the mean $CCT \pm SD$ of the aphakic group (587 ± 65) was significantly higher than the pseudophakic group ($539 \mu m \pm 37$; $P=0.018$). Similarly, after 6 months, the mean $CCT \pm SD$ for aphakic and pseudophakic groups was $602 \mu m \pm 65$ and $540 \mu m \pm 36$, respectively ($P=0.012$). In the pseudophakic group, CCT 1 and 6 months after the operation was comparable to baseline values ($p=0.463$ and 1.00 , respectively). However, in the aphakic group, CCT was significantly increased 1 and 6 months after surgery compared to baseline values ($p<0.001$ and $p<0.001$). Mean IOP before and 6 months after surgery was 15 ± 5.6 and 14.5 ± 4.2 mmHg, respectively, in pseudophakic eyes ($P=0.51$). These amounts were 14.1 ± 4.6 and 15.2 ± 3.3 mmHg, respectively, for aphakic eyes ($P=0.39$).
- **Conclusion:** CCT in eyes with congenital cataracts was similar to CCT in normal age-matched eyes. However, shortly after pediatric cataract surgery, CCT values increased significantly in aphakic but not in pseudophakic eyes.

Central Corneal Thickness Measurements after Myopic Photorefractive Keratectomy Using Galilei, Orbscan II, and Ultrasonic pachymetry

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- **Purpose:** To compare central corneal thickness (CCT) measurements obtained with a dual Scheimpflug camera system (Galilei; Zimmer), with scanning slit topography (Orbscan II; Bausch & Lomb), and with ultrasound (US) pachymetry (SP-2000; Tomey) in eyes after photorefractive keratectomy (PRK) for myopia.
- **Methods:** Fifty patients (100 eyes) who had undergone PRK for correction of myopia or myopic astigmatism in the late postoperative period (at least 5 months prior) were enrolled in this prospective study. Central corneal thickness was measured using Galilei, Orbscan II and US pachymetry in one session. Data were analyzed with paired t-test, linear regression, and Bland-Altman plots.
- **Results:** The mean CCT measurements with Galilei, Orbscan II, and US pachymetry were $524.06 \pm 38.56 \mu\text{m}$, $505.92 \pm 47.35 \mu\text{m}$ and $496.97 \pm 42.74 \mu\text{m}$, respectively. The lower to upper 95% limits of agreement (LoA) with US pachymetry were 2.4 to $51.8 \mu\text{m}$ for Galilei and -22.2 to $40.1 \mu\text{m}$ for Orbscan II. With application of a correction factor of 0.95 for the Galilei measurements, the mean of the corrected CCT was 497.33 ± 36.59 , and the lower to upper 95% LoA with US pachymetry were -25.9 to $25.5 \mu\text{m}$. The acoustic factor for Orbscan II was 0.94.
- **Conclusion:** The Galilei system overestimates the CCT compared with US pachymetry and Orbscan II in late postoperative PRK eyes. With the application of a correction factor of 0.95, the Galilei measurements are closer to US pachymetry and exhibit better agreement than Orbscan II in these patients.

Comparison of Two- Step Mitomycin with Routine Application of Mitomycin in High Myopic PRK

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- **Purpose:** To compare two-step Mitomycin with routine application of Mitomycin in high Myopic PRK.
- **Methods:** 140 patients (280eyes) underwent PRK with an identical operation technique except for duration of Mitomycin-C. One group (70eyes) was treated with 45seconds and another group with 45 and 15 seconds of MMC 0.02%. Corneal haze was measured at 6 months follow-up.
- **Results:** In two-step MMC application was recorded 132 eyes (94.3%) corneal haze=0, 6 eyes (4.3%) corneal haze= +1, 2 eyes (1.4%) corneal haze=+2. In one step MMC was recorded, 122 eyes (87.1%) corneal haze= 0, 7 eyes (5%) corneal haze= +1, 6 eyes (4.3%) corneal haze= +2 and, 5 eyes (3.6%) corneal haze= +3.
- **Conclusion:** Corneal haze is dependent on duration of MMC statistically ($p = 0.04$) in high myopic PRK.

Postoperative Pain in Cooling versus Conventional PRK

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- **Purpose:** To evaluate the effect of corneal surface cooling on postoperative pain after correction of myopia.
- **Methods:** In a prospective experimental clinical trial 94 eyes of 47 myopic patients (age range, 24.8 ± 4.5 years) with mean refraction of -3.60 ± 1.60 diopters (D) were studied. Randomly, one eye was irrigated with cool balanced salt solution (BSS) between ablation passes and immediately at the end of the surface ablation (cooling group) while the second eye was not (conventional method group). Postoperative pain was assessed using Visual Analogue Scale (VAS) after 6, 12, 48, and 72 hours (h). Visual acuity, corneal haze and conjunctival or lid edema were recorded in each group and compared.
- **Results:** Mean VAS in the cooling group was 15 at 6 hours, 10 at 12 hours and zero at 48 and 72 hours. In the conventional group, mean VAS was 30 at 6 hours, 15 at 12 hours and zero at 48 and 72 hours. The difference in the first six hours was significant. No difference was found in complications between two groups.
- **Conclusion:** Cooling and rehydration of the cornea with chilled BSS between passes during PRK significantly reduces post operative pain without additional complications.

Deep Anterior Lamellar Keratoplasty in Patients with Keratoconus: Big-bubble Technique

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- **Purpose:** To evaluate the visual and refractive outcomes after deep anterior lamellar keratoplasty (DALK) using the big-bubble technique in eyes with keratoconus.
- **Methods:** In this case series, eyes with moderate to advanced keratoconus underwent DALK. All of them had unacceptable spectacle-corrected visual acuity or were contact lens intolerant. DALK was performed using the big-bubble technique. Full thickness donor cornea without Descemet's membrane (DM) was sutured to the recipient bed with three different suturing techniques. The visual acuity (presented in logMAR), refractive status, intraoperative and postoperative complications were evaluated.
- **Results:** One-hundred and twenty-nine consecutive eyes of 121 patients were included. In 3 eyes, the operation was converted to penetrating keratoplasty (PKP). Therefore, 126 eyes (79 male) were enrolled in the study. Mean patient age at the time of surgery was 26.08 ± 7.6 years. Mean follow-up period was 21.62 ± 9.0 months. Mean preoperative corrected visual acuity was 1.27 ± 0.4 logMAR, increasing to 0.25 ± 0.2 logMAR at final follow-up examination ($P < 0.001$). Postoperative mean spherical equivalent refractive error, refractive and keratometric astigmatism were -3.41 ± 3.1 D, 3.04 ± 2.3 D, and 3.67 ± 2.1 D, respectively. Bared DM was achieved in 103 eyes while in 23 eyes, pre-Descemet dissection was performed. DM perforation occurred in 5 eyes. The main complications encountered were filamentary keratitis, subepithelial graft rejection and astigmatism.
- **Conclusions:** DALK using the big-bubble technique appears to be a safe and effective procedure for eyes with moderate to advanced keratoconus. In case of extensive intraoperative DM perforation, it does not pose any limitation to ongoing penetrating keratoplasty.

A Comparison of Therapeutic Effects of Vancomycin and Cefazolin with Povidone Iodine on Corneal Ulcer in Rabbits

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- **Purpose:** The present study aimed to settle the effects of intraocular 5% and 10% topical povidone iodine in prevention of bacterial corneal ulcers in a rabbit model, as well as to compare the results with vancomycin and cefazolin eye drops.
- **Methods:** Forty eyes of 20 wild rabbits were randomly assigned to four equal groups including: group 1) 5% povidone iodine and vancomycin; group 2) 5% povidone iodine and cefazolin; group 3) 10% povidone iodine and vancomycin; group 4) 10% povidone iodine and cefazolin (one drop every two hours for seven days). The animals were anesthetized with ketamine hydrochloride and xylazine chloride. Then, a circular clear six mm incision about 0.2 mm deep was made in the center of the cornea in both eyes using a corneal transplant trephine. Finally, two drops of the staphylococcus contaminated media were dropped in both eyes.
- **Results:** There was no statistically significant difference in density or size of infiltration, hypopyon, and fibrin formation between four groups. Epithelial defect, stromal edema, conjunctival injection and chemosis was significantly higher in 5 and 10% povidone iodine groups as compared to cefazolin and vancomycin groups. Thinning was more common in the cefazolin group. There was one sealed corneal perforation in the cefazolin group at the beginning and at day 6, one perforation in cefazolin group and one perforation in 10% povidone iodine group.
- **Conclusion:** Cefazolin and vancomycin had a superior antibacterial effect on the staphylococcal corneal ulcers in this study. 5 and 10% povidone iodine was toxic to the corneal epithelium. Thinning and perforation was more common with cefazolin. Undesirable effects of povidone iodine may be the result of the lack of deep penetration of this drug into corneal stroma, but other factors may be involved.

Normal Values of Interpupillary Distance (P.D) in an Iranian Population

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- **Purpose:** This study was conducted to define some standard measures for interpupillary distance (PD) in different age groups in an Iranian population.
- **Methods:** 1500 patients aged between 5 to 80 years were selected from outpatient department of Farabi Eye hospital (affiliated to Esfahan University of Medical Sciences and Health Services) during 1992- 1993. Complete ophthalmologic examination including interpupillary distance measurement by objective autorefractometer (Topcon, RMA-2000) was performed for each patient. The patients included had no other ocular pathology except for refractive error.
- **Results:** The mean PD in adults was 6213. 73 mm; it was 61131-347 mm in women and 63.57:3.90 mm in men ($P<0.001$). In 96.2 percent of adults PD was in the range of 55-70 mm.
- This study showed a relation between PD and age ($r=0.33$ in women and $r=-0.47$ in men). Contrary to old belief, PD continued to increase after 30 years of age. P.D increased 1.7mm during the 4th decade, 0.6mm during the 5th decade, and 1mm after the 5th decade of life.
- **Conclusion:** The increase in P.D does not stop at 30 years of ages.

Evaluation of the Effect of Intraoperative Use of Mitomycin-C (MMC) on Corneal Endothelium during PRK

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- **Purpose:** To study the toxicity of MMC on corneal endothelial cell after PRK and to compare endothelial cell density when MMC is not used in PRK.
- **Methods:** A non-randomized clinical trial was performed from January 2009 to September 2009 at Parsian Eye Clinic in Esfahan-Iran. 148 eyes of 74 simple myopic and myopic astigmatic eyes were divided into two groups. 74 eyes underwent PRK with MMC and 74 eyes underwent PRK without MMC. Patients were followed for endothelial cell loss for 6 months.
- **Results:** There were 51 cell (1.8%) losses in ECD in PRK with MMC group that was significant as shown by t-test. (P -value=0.005) In PRK without MMC group, only 14 cells (0.5%), reduced after operation that was nonsignificant. Although, endothelial cell loss was significant in PRK with MMC, but comparison between endothelial cell losses in 2 groups, showed no significance according to chi-square test.
- **Conclusion:** This study showed that MMC has an effect on corneal endothelial cell and slightly reduced them, but this effect is not significant enough to convince us to ignore its benefits in prophylaxis for corneal Haze formation after PRK.

Comparison of Intraocular Pressure (IOP) Measurement Before and After Photorefractive Keratectomy (PRK) Using Air Puff, Goldman (GAT) and Dynamic Contour Tonometry (DCT)

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- **Purpose:** IOP measurement after PRK has been a challenging issue due to corneal thickness and biomechanical alterations. This study was performed to evaluate three IOP measurement techniques.
- **Methods:** In this observational prospective study, 402 eyes of 201 patients; 162 females and 32 males with a mean age of 28.07 ± 7.03 years who were candidates for PRK were evaluated for IOP before and after surgery. In each of the eyes GAT, DCT and Air puff tonometry was performed before and two months after surgery.
- **Results:** Mean preoperative readings before surgery with GAT, DCT and Air puff were 15.44 ± 2.79 , 16.81 ± 3.39 and 16.13 ± 3.26 mmHg, respectively. Two months postoperatively, measurements were 12.04 ± 2.63 , 13.57 ± 2.91 and 11.01 ± 3.29 mmHg for three devices, respectively ($P = 0.001$ for all three quantities).
- **Conclusions:** IOP after PRK is underestimated with all three methods. Underestimation is less pronounced with DCT.

TNF-alpha Gene Polymorphisms in Patients with Behcet's Disease and Ocular Involvement

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- **Purpose:** Evaluation of the distribution of TNF-alpha promoter -1031T/C and -308G/A polymorphisms in Iranian Azeri Behcet's patients with ocular manifestation
- **Method:** We investigated the distribution of TNF-alpha promoter -1031T/C and -308G/A polymorphisms in 53 Behcet's disease (BD) patients of Iranian Azeri Turk descent and 79 matched healthy controls using the PCR-RFLP technique.
- **Results:** The frequency of the TNF-alpha -308-G/A polymorphism was similar between Behcet's patients and healthy controls ($p = 0.234$) whereas the frequency of the TNF-alpha -1031T/C polymorphism was different between Behcet's patients and healthy controls ($P = 0.0006$). The frequency of CG haplotype was significantly higher ($p < 0.0001$), and that of the TA haplotype was significantly lower in BD patients than in healthy controls. Different TNF- Δ -1031T/C and TNF- Δ -308-G/A polymorphisms were not associated with ocular involvement
- **Conclusion:** These results suggest that TNF-alpha is a susceptibility gene for BD in patients from Iranian Azeri Turk ethnic group. There is no relation between different haplotypes in investigated genetic region with ocular manifestation in this ethnic group of BD patients.

Topiramate Induced Bilateral Anterior Uveitis Associated with Hypopyon Formation

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- **Purpose:** To report a rare case of bilateral anterior uveitis with hypopyon formation following systemic topiramate use.
- **Materials:** A 40-year-old lady with migraine headaches who was under topiramate treatment referred with bilateral ocular pain and visual blurring. Physical examination disclosed shallow anterior chamber and high intraocular pressure in both eyes. Following discontinuation of topiramate a severe bilateral anterior uveitis with posterior synechiae and hypopyon developed.
- **Results:** Ocular inflammation resolved with systemic and topical steroids. Because of severe cataract and synechiae formation she underwent phacoemulsification/posterior chamber intraocular lens implantation and her visual acuity of both eyes improved to 20/25.
- **Conclusion:** Topiramate should be added to the list of drugs that may cause anterior uveitis and hypopyon formation.

Confocal microscopy in chronic and delayed mustard gas keratopathy

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- **Purpose:** To evaluate in vivo confocal microscopic features of the cornea in chronic and delayed mustard gas keratopathy (MGK). Twenty-two eyes of 22 consecutive patients with MGK and 28 eyes of 28 normal unoperated subjects were enrolled.
- **Methods:** All subjects underwent corneal confocal scanning, and the findings were compared between the 2 groups. Qualitative (layer thickness measurement and cell count) and quantitative (nerve and deposit evaluation) findings of corneal confocal scanning.
- **Results:** All subjects with MGK and normal subjects were males, with no significant difference in mean age between the 2 groups. Mean central corneal thickness, mean epithelial thickness, mean cell density of basal epithelia, keratocyte density at 3 stromal layers, and endothelial cell density in the MGK group were significantly lower than those in the control group. Loss of keratocytes was predominantly observed in the anterior to middle stroma. In vivo confocal microscopy revealed lack of a subbasal nerve plexus, presence of intrastromal hyperreflective microdots, prominent thickened midstromal nerves, enlarged bizarre-looking keratocytes, amyloid degeneration, lipid keratopathy, posterior stromal folds, and endothelial cell pleomorphism and polymegathism.
- **Conclusions:** Corneal thinning, significant loss of keratocytes together with pleomorphic residual keratocytes, thickened midstromal nerve, stromal microdots, amyloid degeneration, and lipid keratopathy were remarkable findings observed in our cases. Although all the corneal layers were affected significantly by mustard gas, the anterior to middle parts of the cornea were more involved than the posterior parts.

Spherical Aberration and Contrast Sensitivity Function in Eyes Implanted with Spherical and Aspheric Intraocular Lenses: A Clinical Trial

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- **Purpose:** To compare visual performance including visual acuity, mesopic and photopic contrast sensitivity function, and spherical aberration in eyes implanted with a spherical intraocular lens (IOL) or one of two aspheric IOLs.
- **Methods:** In this randomized prospective clinical trial, 51 eyes of 51 patients (31 male) underwent phacoemulsification and were randomly implanted with the Sensor IOL (n=17), Tecnis IOL (n=17), or AcrySof IQ IOL (n=17). At postoperative month 3, a comprehensive ophthalmic examination including uncorrected and best spectacle-corrected visual acuity (UCVA and BSCVA, respectively), pupillometry, wavefront analysis, and contrast sensitivity function (CSF) was performed and compared between the study groups.
- **Results:** The mean patient age was 61.1 ± 8.6 years in the Sensor group, 58.2 ± 6.1 years in the Tecnis group, and 57.2 ± 5.7 years in the AcrySof IQ group ($P=0.25$). The mean postoperative BSCVA was 0.11 ± 0.10 , 0.08 ± 0.08 , and 0.08 ± 0.07 logMAR, respectively ($P=0.37$). Spherical aberration measured over 4- and 6-mm pupils was significantly higher in the Sensor than in the two other groups which had comparable results. The results of CSF in the Sensor group were inferior to the aspheric groups in the majority of spatial frequencies. Comparing the two aspheric groups, however, the Tecnis IOL yielded a significantly better mesopic CSF at 1.5 and 3 cpd spatial frequencies.
- **Conclusion:** The two aspheric IOLs provided a significantly better visual function as compared to the spherical IOL. The Tecnis IOL appeared to work better under mesopic lighting conditions at low spatial frequencies as compared to the AcrySof IQ IOL.

Dissection Plane in Deep Anterior Lamellar Keratoplasty Using the Big-Bubble Technique

Jafarinasab MR, Rahmati-Kamel M, Kanavi MR, Feizi S

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences

- **Purpose:** To find the level of dissection in keratoconic corneas undergoing deep anterior lamellar keratoplasty (DALK) using the big-bubble technique.
- **Methods:** In three keratoconic eyes that underwent DALK, the operation was converted into penetrating keratoplasty after complete big-bubble formation because of extensive tear in Descemet's membrane (DM) during stromal excision. The corneal stroma and DM taken from these eyes were submitted for light and transmission electron microscopy.
- **Results:** Both light and transmission electron microscope revealed a thin layer of corneal stroma adhered to DM in all cases. In 2 eyes, the residual stromal thickness was almost constant (6.4 μm and 12.3 μm), whereas it varied from 9.5 μm to 25.8 μm in the other one.
- **Conclusion:** Dissection plane in DALK using the big-bubble technique can be within corneal stroma rather than exactly between stroma and DM. Various corneal pathologies as well as different techniques of dissection may have influence on this level.

Biomechanical Properties of Graft after Penetrating Keratoplasty versus Deep Anterior Lamellar Keratoplasty

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- **Purpose:** To compare biomechanical properties of transplanted corneas after penetrating keratoplasty (PK) with those after deep anterior lamellar keratoplasty (DALK) using Anwar's big-bubble technique.
- **Methods:** This cross-sectional comparative study consisted of 45 PK eyes (group 1) and 23 DALK eyes (group 2) with the underlying pathology of keratoconus. The graft biomechanical properties namely corneal hysteresis (CH), corneal resistance factor (CRF), Goldmann-correlated intraocular pressure (IOPg), and cornea-compensated IOP (IOPcc) were measured by the ocular response analyzer and compared between the study groups.
- **Results:** Mean patient age was 29.8 ± 6.1 years in group 1 and 27.2 ± 6.5 years in group 2 ($P=0.11$) and they were followed up for 31.4 ± 19.0 months and 29.2 ± 17.3 months after corneal transplantation, respectively ($P=0.27$). There was no significant difference between the study groups in terms of recipient ($P=0.21$) and donor ($P=0.57$) trephine sizes or BSCVA ($P=0.77$). CH was measured 10.09 ± 2.5 mmHg in group 1 and 9.64 ± 2.1 mm Hg in group 2 ($P=0.36$). CRF was 10.13 ± 2.2 and 9.36 ± 2.1 mmHg, respectively ($P=0.17$). Similarly, no significant difference was found between group 1 and 2 in terms of IOPg ($P=0.25$) and IOPcc ($P=0.80$).
- **Conclusion:** DALK using the big-bubble technique provides biomechanics comparable to PK in keratoconic eyes.

Dissection Plane in Deep Anterior Lamellar Keratoplasty Using the Big-Bubble Technique

Jafarinasab MR, Rahmati-Kamel M, Rezaei Kanavi M, Feizi S,

Ophthalmic Research Center, Shahid Beheshti University of Medical Sciences

- **Purpose:** To find the level of dissection in keratoconic corneas undergoing deep anterior lamellar keratoplasty (DALK) using the big-bubble technique.
- **Methods:** In three keratoconic eyes that underwent DALK, the operation was converted into penetrating keratoplasty after complete big-bubble formation because of extensive tear in Descemet's membrane (DM) during stromal excision. The corneal stroma and DM taken from these eyes were submitted for light and transmission electron microscopy.
- **Results:** Both light and transmission electron microscope revealed a thin layer of corneal stroma adhered to DM in all cases. In 2 eyes, the residual stromal thickness was almost constant (6.4 μm and 12.3 μm), whereas it varied from 9.5 μm to 25.8 μm in the other one.
- **Conclusion:** Dissection plane in DALK using the big-bubble technique can be within corneal stroma rather than exactly between stroma and DM. Various corneal pathologies as well as different techniques of dissection may have influence on this level.

A Comparison of the Incidence of Posterior Capsular Opacity among Three Types of Acrylic Intraocular Lenses Implanted During Cataract Surgery

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- **Purpose:** In this study, we compared different types of acrylic intraocular lenses (IOLs) in patients who had cataract surgery to show if there is any difference among types of intraocular lenses (IOLs).
- **Methods:** This is a retrospective case control study that was performed at Cebu Doctors' University Hospital. All the charts of patients who had phacoemulsification cataract surgery (MILLENIUM phaco machine) with implantation of posterior capsular intraocular lens between 2004-2008 were reviewed.
- **Results:** Patients included in this study were divided into two groups based on the presence of posterior capsular opacity. These groups were further subdivided into 3 subgroups according to the type of acrylic intraocular lenses used: Acrysof (company, n=169), Acryfold (company, n=149), and Eyecryl (company, n=58). From a total of 376 eyes 52 eyes needed YAG-capsulotomy after one year: 23 from Acryfold, 21 from Acrysoft, and 8 eyes from Eyecryl IOLs.
- **Conclusion:** This study showed that although there seems to be a significant difference between Eyecryl IOLs and the other two brands in short time after 1 year there is no statistically significant difference between these 3 types of IOLs

Long-term outcomes of penetrating keratoplasty in chronic and delayed mustard gas keratitis

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- **Purpose:** To report the long-term outcomes of penetrating keratoplasty (PKP) in war victims with chronic and delayed mustard gas keratitis.
- **Methods:** This noncomparative interventional case series includes patients with advanced chronic or delayed mustard gas keratitis who had undergone PKP from 1989 to 2006. Best-corrected visual acuity (BCVA), graft clarity, episodes of graft rejection, duration of steroid use, and complications were evaluated. Histopathologic features of excised corneal buttons were also evaluated.
- **Results:** Overall, 22 eyes of 19 patients underwent PKP. Mean age at the time of surgery was 41 \pm 4.6 years (range, 36-54 years), and mean follow-up duration was 40.9 \pm 48 months (range, 4-204 months). The graft remained clear in 17 (77.3%) eyes and failed in 5 (22.7%) eyes. Overall, 13 (59.1%) eyes experienced episodes of endothelial rejection, and 5 (22.7%) eyes had subepithelial immune rejection, 4 of which had simultaneous endothelial rejection. Fifteen (68.2%) eyes received topical steroids for >6 months. Fourteen (63.6%) eyes developed cataracts, leading to cataract extraction in 7 eyes. One eye developed steroid-induced glaucoma after multiple episodes of endothelial graft rejections. Mean preoperative BCVA was 1.92 \pm 0.63 logMAR, which improved to 1.04 \pm 0.65 logMAR (20/200) overall and 0.8 \pm 0.3 logMAR (20/120) in eyes with clear grafts ($P < 0.001$). Main histopathologic features of excised corneal buttons included corneal thinning and ulceration, loss of keratocytes, acute and chronic inflammation, stromal vascularization, and degenerative sequelae of long-standing inflammation.
- **Conclusions:** PKP in chronic or delayed-onset mustard gas keratitis should be considered as a high-risk graft; however, with appropriate management, graft clarity and visual outcomes may be favorable.

Efficacy of topical cyclosporine A for treatment and prevention of graft rejection in corneal grafts with previous rejection episodes

Javadi MA, Feizi S, Karbasian A, Rastegarpour A

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- **Purpose:** To evaluate the efficacy of 2% topical cyclosporine A in treating and preventing graft rejection episodes after penetrating keratoplasty (PKP) in patients with a history of graft rejection.
- **Methods:** In this prospective, randomized, double-blind clinical trial, a group of PKP patients were randomly given 2% topical cyclosporine A (group 1) or a placebo (group 2) in addition to a corticosteroid regimen upon an episode of subepithelial or endothelial graft rejection. The topical cyclosporine and placebo were continued for 6 months. The duration of corticosteroid application and the time to resolution of the rejection episode for which cyclosporine or placebo was started, the number of concurrent and subsequent rejection episodes, and the rate of rejection-free survival were compared between the two groups.
- **Results:** Twenty-two eyes of 22 patients (12 men) were in group 1 and 21 eyes of 21 patients (10 men) were in group 2. Mean patient ages were 32.48 \pm 11.9 years and 35.48 \pm 11.7 years in group 1 and 2, respectively ($P=0.42$). Mean follow-up period was 16.6 \pm 6.1 months and 16.0 \pm 6.3 months, respectively ($P=0.75$). The episode for which 2% topical cyclosporine or placebo was started completely resolved after 25.6 \pm 21.0 days and 33.2 \pm 16.7 days in group 1 and 2, respectively ($P=0.22$). The rejection-free graft survival rate was 34.8% in group 1 and 31.7% in group 2 ($P=0.89$).
- **Conclusion:** 2% topical cyclosporine A did not add any advantage to conventional corticosteroid therapy in terms of treating and preventing graft rejection in PKP patients with previous history of rejection episodes.

Graft Refractive Surgery for Post-DALK Astigmatism in Keratoconus

Javadi MA, Feizi S, Mirbabaee F, Rastegarpour A

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- **Purpose:** To find an effective and reliable method to correct astigmatism after deep anterior lamellar keratoplasty (DALK) in patients with keratoconus.
- **Methods:** This interventional case series included keratoconic eyes undergoing graft refractive surgery (GRS) for intolerable post-DALK astigmatism. The technique of graft refractive surgery for the 5 initial cases consisted of only relaxing incisions at the steep meridian in the graft-host interface down to Descemet's membrane. For the rest, the relaxing incisions at the steep meridian were accompanied by simultaneous suturing and the effect of the relaxing incisions was controlled through selective suture removal starting a few days after the operation. The main outcomes were uncorrected and corrected visual acuity, and change in refractive and keratometric astigmatism using subtraction and vector analysis methods.
- **Results:** Fourteen eyes of 14 keratoconic patients (12 males) with the history of DALK underwent GRS. Mean patient age was 29.36 ± 6.2 years. Mean follow-up period was 12.0 ± 7.4 months after the first GRS. Mean preoperative BCVA was 0.29 ± 0.1 logMAR, increasing to 0.22 ± 0.1 logMAR after the operation ($P=0.007$). Average keratometric astigmatism was reduced by 3.8 D and 5.5 D measured with subtraction and vector analysis methods, respectively. Four (80%) out of 5 eyes who had only relaxing incisions initially, required suturing of the incisions because of overcorrection, whereas none of the patients undergoing simultaneous relaxing incisions and suturing required further intervention.
- **Conclusion:** Relaxing incisions and suturing at the steep meridian followed by selective suture removal can effectively and predictably reduce post-DALK astigmatism in patients with keratoconus.

Deep Anterior Lamellar Keratoplasty versus Penetrating Keratoplasty for Keratoconus: A Clinical Trial

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- **Purpose:** To compare deep anterior lamellar keratoplasty (DALK) using the big-bubble technique with penetrating keratoplasty (PK) in patients with keratoconus.
- **Methods:** In this clinical trial, patients with moderate to advanced keratoconus with poor spectacle-corrected visual acuity and intolerance to contact lens wear were enrolled. DALK was performed using the big-bubble technique, and a full-thickness donor cornea without Descemet's membrane was sutured to the recipient bed. PK was performed conventionally with a Hessburg-Barron suction trephine. Three types of suturing were used for both groups. Postoperative refractive errors, best corrected visual acuity (BCVA), contrast sensitivity function (CSF) and higher order aberrations (HOAs) were compared between the study groups.
- **Results:** The study included 81 eyes of 81 patients. Forty-six eyes underwent DALK from whom 4 were excluded because of failure to achieve bare Descemet's membrane. Thirty-five eyes received PK. Mean patient ages were 26.91 ± 7.9 versus 30.89 ± 10.3 years in the DALK and PK groups, respectively ($P=0.06$). Mean follow-up period was 22.0 ± 7.9 months in the DALK group and 24.6 ± 3.5 months in the PK group ($P=0.32$). Mean postoperative spherical equivalent refractive error was -3.23 ± 3.4 D in the DALK group versus -2.22 ± 4.6 D in the PK group ($P=0.28$) and mean postoperative BCVA was 0.18 ± 0.08 logMAR and 0.15 ± 0.10 logMAR, respectively ($P=0.12$). CSF and total aberrations and HOAs were comparable in the study groups.
- **Conclusions:** DALK is an effective alternative surgical procedure for patients with keratoconus; the outcomes are comparable to PK in terms of refractive errors, BCVA, CSF and HOAs.

Evaluation of Corneal Pachymetry Measurements by Galilei Dual Scheimpflug Camera

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- **Purpose:** Evaluation of Corneal Pachymetry measurements by Galilei Dual Scheimpflug Camera by comparing central corneal thickness measured by Galilei with Orbscan II and ultrasonic pachymetry
- **Methods:** Central corneal thickness (CCT) was measured in a total of 184 eyes of 92 healthy subjects using Galilei, Orbscan II, and ultrasonic (U/S) pachymetry. Considered as a benchmark, the measurements by ultrasonic pachymetry were compared with those measured by the other two systems.
- **Results:** Mean CCT was 544.4 ± 33.4 μm , 546.7 ± 37.9 μm , and 555.8 ± 29.6 μm as measured by ultrasonic pachymetry, Orbscan II, and Galilei systems, respectively. The mean difference of readings measured by U/S pachymetry with those measured by Orbscan II (acoustic coefficient 0.96) and Galilei were 2.3 μm and 10.2 μm , respectively. In spite of this discrepancy, the Galilei system had better agreement with U/S pachymetry than did Orbscan II and U/S pachymetry (Correlation coefficient 0.947 vs. 0.817). Considering 0.98 as acoustic coefficient for Galilei CCT reading, makes its measurements identical to ultrasound pachymetry.
- **Conclusion:** Galilei measurements of CCT are well correlated with ultrasound pachymetry in normal eyes. After considering an acoustic coefficient equal to 0.98 for Galilei, its measurements will become equal to ultrasound values.

Conventional Versus Customized Ablation: A Randomized Clinical Trial

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- **Purpose:** To compare the visual outcomes and changes in higher-order aberrations (HOAs) between conventional and customized photorefractive keratectomy (PRK).
- **Methods:** In this clinical trial, 58 eyes of 29 patients underwent myopic PRK using Technolas 217Z excimer machine. After comprehensive evaluation, one eye of each participant randomly received conventional ablation (group 1) and customized treatment was performed in the fellow eye (group 2). The change in postoperative visual acuity, cycloplegic refraction, scotopic contrast sensitivity function (CSF), HOAs, and subjective complaints of halos and glare were compared between the two groups.
- **Results:** Mean subject age was 26.7 ± 6.0 years. Mean preoperative cycloplegic spherical equivalent refractive error and refractive astigmatism were -4.92 ± 1.6 D and 0.91 ± 1.0 D, respectively. There was no significant difference between the two groups in terms of preoperative cycloplegic refractive error, HOAs and CSF. Mean follow-up period was 8.1 ± 3.3 months. Postoperatively, total HOAs for 4-mm pupil was increased by 0.24 ± 0.19 μm in group 1 and by 0.31 ± 0.21 μm in group 2 ($P < 0.001$). Postoperative HOAs for 6-mm pupil were 0.34 ± 0.23 μm and 0.52 ± 0.32 μm in that order ($P = 0.03$). The increase from preoperative to postoperative HOAs was significantly higher in group 2 in 6-mm zone ($P = 0.03$) but not in 4-mm zone ($P = 0.26$). Scotopic CSF was significantly reduced in both groups, but there was no significant difference between the study groups regarding postoperative CSF and subjective complaints.
- **Conclusion:** HOAs were significantly increased after PRK with both methods. The increase in HOAs after customized ablation treatment was significantly higher than that after conventional ablation.

Accommodative Changes after Photorefractive Keratectomy in Myopic Eyes

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- **Purpose:** To determine the changes of amplitude and facility of accommodation (AA and FA) in myopic patients after photorefractive keratectomy (PRK).
- **Methods:** Using Technolas 217Z excimer laser, 160 myopic eyes of 80 patients underwent PRK. The patients were categorized into 2 age groups: <30 and 30 years old. Changes in AA and FA were observed before, 2 weeks, 1 and 3 months after PRK. The role of preoperative AA, FA, refractive spherical equivalent (SE), age, and sex on postoperative AA and FA were evaluated.
- **Results:** In younger patients, AA and FA were 7.77 ± 1.75 D and 7.75 ± 3.97 cycle/minute (c/m) which changed to 8.36 ± 1.26 D and 11.57 ± 4.20 c/m three months after PRK, respectively ($P < 0.001$). These values were 6.66 ± 1.41 D and 5.05 ± 3.26 c/m which changed to 6.72 ± 1.26 D ($P = 1.000$), 9.58 ± 4.29 c/m ($P < 0.001$) in older patients, respectively. Two weeks after surgery, preoperative AA and SE had a significant effect on postoperative AA while preoperative AA and age had a significant effect on postoperative AA after 3 months ($P < 0.001$). Postoperative FA was positively related to preoperative FA and female sex ($P < 0.05$).
- **Conclusions:** This study suggests that some of the near vision problems in younger myopes in early postoperative days after PRK might be due to decrease in AA and FA, which will eventually increase. However, in older patients, despite increase in FA, AA did not change.

Cataract Surgical Coverage in an Iranian Population

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- **Purpose:** Although cataract is known as the leading cause of blindness and severe visual impairment in Iran, published data that evaluate the cataract surgery coverage are insufficient. The present study attempted to bridge this information gap.
- **Method:** This cross-sectional population-based study was performed using systematic and clustered randomization and compact sampling method from February to August 2009 in Varamin district, Tehran. Cataract surgery coverage (CSC) is an impact indicator, measuring the proportion of operable cataract cases that have been operated on in a defined population at a particular point in time.
- **Results:** 2819 persons (response rate=94%) including 1270 men (45.7%) and 1549 (54.3%) women with a mean \pm SD age of 60.8 ± 9.3 years were assessed. 530 (17.6%) people had a history of cataract surgery. The adjusted cataract surgical coverage in eyes based on different visual categories (VA<3/60, VA<6/60 and VA<6/18) were 88.8%, 84.3% and 65% in men, 90.6%, 85.3%, 67.5% in women and 89.7%, 84.8% and 66.2% among total eyes, respectively. The adjusted cataract surgical coverage in persons based on different visual categories (VA<3/60, VA<6/60 and VA<6/18) in the better eye were 97.3%, 94.1% and 80.1% in men, 97.8%, 94.1% and 80.9% in women and 97.5%, 94.1% and 80.5% in total persons, correspondingly.
- **Conclusion:** Among a representative sample of Iranian population, cataract surgery had an acceptable coverage rate in both genders. This is justified considering the sufficient proportion of ophthalmologists in Iran and acceptable insurance coverage for ophthalmic surgeries.

Preoperative Subpterygeal Injection versus Intraoperative Application of Mitomycin C for Pterygium Removal: Comparison of Results and Complications

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- **Purpose:** Evaluation and comparison of recurrence rate and complications between two therapeutic methods for primary pterygium: Subconjunctival injection of mitomycin C (MMC) one month before bare scleral excision and conjunctival rotational flap with intraoperative MMC
- **Methods:** Setting: institutional clinical trial in a tertiary, specialty eye hospital. Study Population and Intervention: We included 82 eyes diagnosed with primary pterygium and randomly allocated them into two groups: group A consisting of 36 eyes treated with subconjunctival injection of 0.02% MMC one month before bare scleral excision; and group B composing of 46 eyes underwent conjunctival rotational flap with intraoperative 0.02% MMC for 2 minutes. Follow-up periods were at least 12 months (12-18 months). Main Outcome Measure: recurrence and complication rate in each arm of study.
- **Results:** During 1-year follow-up period 2 cases of clinical recurrence in 3rd & 6th month of follow-up occurred in group B (recurrence rate of 4.3%). In group A, there was no clinically significant recurrence, but two cases of hypovascularity and whitening of sclera at the site of pterygium excision was observed. There was no other serious complication. There was no statistically significant difference between groups for recurrence rate, mean age, sex, or pterygium area.
- **Conclusions:** Subconjunctival injection of MMC 0.02% (0.1 ml of 0.02% solution) one month before bare scleral excision is a quick, easy and safe surgical procedure, and is at least as effective as conjunctival rotational flap with intraoperative MMC for 2 minutes.

Autologous Serum in the Treatment of Filamentary Keratitis

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- **Purpose:** To assess the effect of 20% topical autologous serum solution on the treatment of intractable filamentary keratitis.
- **Methods:** This non-controlled clinical trial included 20 cases. The subjects were complaining of tearing, photophobia and foreign body sensation and were diagnosed with filamentary keratitis due to different causes, non-responsive to conventional medical therapies. The patients received a trial of topical treatment with 20% solution of mixed autologous serum and non preservative artificial tear, using the preparation every four hours per day for at least one month. They were followed for a mean duration of 4 months. The outcome was measured as subjective improvement of symptoms and stable ocular surface including absence of filament, epithelial defect and erosion in ocular examination.
- **Results:** The complete response, defined as both subjective improvement of symptoms and stable ocular surface, was achieved in 50% (10/20) after one month of treatment. The response rate increased to 75% (15/20) in the second month with continuation of treatment in non responders, and remained the same (75%) until the end of follow up. Relative response defined as either improvement of symptoms or ocular stability was observed in 5% (1/20) of cases. 20% (4/20) failed to respond, these patients had neither subjective nor objective improvement. No complication was noted. Only one case had a recurrence after 3 months follow up.
- **Conclusions:** 20% topical autologous serum seems to be effective and safe for treatment of refractory cases of filamentary keratitis.

Amniotic Membrane Transplantation for the Treatment of Pseudomonas Keratitis in Experimental Rabbits

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- **Purpose:** Amniotic membrane transplantation (AMT) has been considered in combination with medical treatment in progressive infective keratitis. The purpose of this study was to evaluate the efficacy of AMT as an adjunctive treatment in the management of experimental pseudomonas keratitis.
- **Methods:** Cryopreserved AMT was performed on 12 pseudomonas rabbit corneal ulcers. After one week in one group amniotic membrane transplantation combined with topical medical treatment was done (AMT group). At the end of the second week, the clinical and pathological findings were compared with those obtained from eight corneal ulcers in another group which had only been treated with topical medication (control group).
- **Results:** There was not any significant difference in clinical signs between the two groups at the end of the second week. Corneal perforation was found in three cases of the control group but in none of the cases in the AMT group. Amniotic membranes were melted in four eyes, retracted in three eyes and intact in five eyes. Pathologic examination showed no significant difference in cellular infiltration or density of organism between the two groups.
- **Conclusion:** AMT is effective in preventing corneal perforation in the early stage of experimental pseudomonas keratitis.

Association between Acute Corneal Hydrops and Mitral Valve Prolapse in Patients with Keratoconus

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- **Purpose:** To investigate the association between corneal hydrops and mitral valve prolapse (MVP) in patients with keratoconus (KCN).
- **Methods:** This case-control study included keratoconus cases with corneal hydrops who were referred to Labbafinejad Medical Center or a private clinic between March 2006 and 2008. The control group included group-matched individuals without any ophthalmic diseases who were selected from patients of the same medical centers. The size of control was four times that of the case group to increase the power of the study. All subjects were referred for cardiac examination and underwent two-dimensional M-mode and color Doppler echocardiography. Perloff's criteria were used for diagnosis of MVP. Fisher's exact test and logistic regression analysis were used to compare these two groups.
- **Results:** Overall, 160 participants (32 cases and 128 controls) with mean age of 31.0 ± 13.2 years were studied. Prevalence of MVP was 65.6% in the case group and 9% in controls ($P < 0.001$). Patients with hydrops had an odds ratio of 26.7 for having MVP (95% confidence interval, 9.5-75.2). Age and sex adjusted analysis revealed that the odds ratio of MVP in the case group was higher than the control group.
- **Conclusion:** There seems to be a correlation between corneal hydrops secondary to KCN and MVP suggesting that cardiovascular evaluation be done for mitral valve status and need for prophylaxis against infective endocarditis in these patients.

Detection of Orthoptic Changes after PRK Surgery

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- **Purpose:** The aim of this study was to detect orthoptic changes (visual acuity, sensory and motor condition) after PRK surgery.
- **Method:** This interventional case series was performed on 297 eyes of 150 cases who were candidate for PRK between 2007-2009. Exclusion criteria were, age less than 18 years, diabetes mellitus, collagen disease, keratoconus, keratoconus suspect and ocular surface diseases. Before the intervention, complete ophthalmic and orthoptic examinations were performed that included : best corrected visual acuity, refraction, alternate prism cover test, extra ocular movements, fusional amplitude, near point of convergence, binocular vision, IOP measurement, anterior and posterior segment examination with slit lamp and indirect ophthalmoscope. After pachymetry and performing an Orbscan, patients underwent PRK surgery. Ocular examinations were repeated after 3 months and analyzed by P.T. and x2 tests.
- **Results:** 104 (69.3%) patients were female and 46(30.7%) of them were male, with mean age of 27.6 ± 7.6 years. Preoperative BCVA 20/20 was 84.8%.Postoperative UCVA 2020 was 82.2% and BCVA 2020 increased to 95.3%.Postoperatively 83.2% were emmetropic, 14.1% overcorrected and 2.7% were under corrected. Six eyes (1.98%) developed new astigmatism. Astigmatism axis rotation more than 20 degrees, detected in 7 (2.3%) eyes. Pre and post operative anisometropia was 15.3% and 1.3% respectively. Before surgery two patients (1.3%) had esotropia and 17(11.3%) patients had far or near exotropia. After surgery esotropia remained unchanged but in exotropia group six cases improved and 11 remained eyes unchanged. Six patients developed new exotropia after surgery. Decrease of the pre and postoperative convergence and divergence amplitudes and increase of NPC were statistically significant ($p_1 < 0.001$, $p_2 < 0.001$, $p_3 < 0.006$). Stereopsis was not changed after surgery but before surgery there were 9(6%) patients with stereopsis more than 60 sec of arc (monofixation). None of patients developed diplopia, head posture or keratoconus.
- **Conclusion:** According to these results, after PRK surgery, diminished UCVA 20/20, over or under correction, decreased convergence and divergence amplitude, increased NPC and deviation changes particularly in exotropia group are possible outcomes, and in patients with previous weak fusion, fusional break and manifest deviation and diplopia may be develop, so preoperative complete ocular sensory and motor examinations and cognition of high risk cases recommended. After surgery, refraction outcomes and their relation to fusional amplitude of the patients are important in ocular alignment and must be attended.

The Effect of Bevacizumab on Wound Healing after Primary Pterygium Excision

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- **Purpose:** To evaluate the effect of subconjunctival Bevacizumab on early postoperative wound healing in patients with primary pterygium excision.
- **Methods:** In this randomized, double-blind, placebo-controlled study the patients were randomized into 2 groups. Group 1 received a total of 7.5 mg Bevacizumab (5mg/0.2 ml on the day of surgery and 2.5 mg on the fourth day after surgery). Group 2 received 0.2 ml Balanced Salt Solution at the end of surgery. Postoperatively, patients were examined at 1 day, 1 week, and 1 month. The following parameters were evaluated: horizontal length of the corneal epithelial defect in mm, conjunctival erythema, conjunctival flap edema, subconjunctival hemorrhage, lacrimation, and photophobia. Any complications of conjunctival flaps such as retraction and melting or wound infection were recorded.
- **Results:** There were no statistically significant differences in age, sex, operated eye, and horizontal size of pterygium among 44 eyes of 44 patients, 22 in each group. No patient had conjunctival flap melting or retraction, keratitis, or non-healing corneal epithelial defect. No statistically significant differences were observed between the groups for the measures evaluated except for conjunctival erythema on the first postoperative day ($p=0.005$) which was more common in group 1. Although the horizontal length of corneal epithelial defect in group 1 was twice that of group 2 on the seventh postoperative day (average 0.09mm vs. 0.04mm, range 0-1mm vs. 0-0.3mm), the difference was not statistically significant ($p=0.45$).
- **Conclusion:** No adverse effect was observed on early postoperative wound healing of excised primary pterygium in patients who received subconjunctival Bevacizumab.

Comparative Results of Keratometry with Two Different Keratometers after PRK

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- **Purpose:** Postoperative hyperopia is a frequent consequence of cataract surgery after previous myopic kerato-refractive surgery. One reason for the underestimation of intra-ocular lens (IOL) power is the wrong corneal refractive power measurement obtained by keratometers and corneal topography systems after PRK. The aim of this study was to compare the precision of measurements of two different keratometers after PRK.
- **Methods:** In a prospective randomized clinical trial we studied 70 eyes of 35 refractive patients ranging in age from 21 to 27 years. The preoperative measurements and the measurements three months after PRK were performed with the Javal manual Keratometer (GM300) and the IOL-Master (Carl Zeiss Jena GMBH Germany). We compared our postoperative measurement results obtained with the two keratometers with the results obtained by using the clinical history method (CHM). (Spherical equivalent refraction change)
- **Results:** The smallest mean deviation was achieved with the IOL-Master (measured mean \pm SD: 38.17 ± 0.86 D, vs. CHM: 38.35 ± 2.13 D). The Javal manual Keratometer showed a larger deviation (measured: 38.43 ± 0.67 D, CHM 38.34 ± 2.07 D), which measured on average one diopter higher than that obtained using the CHM. A positive correlation was found between corrected myopia and the postoperative difference between the measured and calculated value for each keratometer.
- **Conclusion:** This study demonstrates that with common keratometers central corneal power is measured too high after PRK. A comparison of postoperative keratometry revealed that IOL-Master keratometer had high correlation with values of CHM keratometry, whereas Javal Manual keratometry results were not as closely related. For IOL calculation in patients after PRK, the wrongly positive deviation from measured central corneal power has to be taken into account.

Photorefractive Keratectomy for Correction of Hyperopia Greater than Three Diopters

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- **Purpose:** To characterize the refractive changes after excimer laser photorefractive keratectomy (PRK) for correction of hyperopia >3 diopters (D) and to assess refractive state and changes in astigmatism.
- **Method:** In a non-comparative, non-randomized, retrospective, interventional study, thirty eyes of nineteen patients (age range, 18 to 66 years) were studied. Their mean refractive error was $+5.45$ D (range $+3.00$ to $+11.00$ D) and mean astigmatism -1.42 D (range 0.00 to -4.75 D). Technolas 217-c excimer laser was used for all cases. Postoperative SE (sphere equivalent); UNCVA (uncorrected visual acuity), BCVA (best corrected visual acuity), haze and all complications were examined 3 to 6 months later.
- **Result:** Mean postoperative refraction was $+1.00$ D (range -2.00 to $+5.00$), mean SE was 0.55 D and mean astigmatism was -0.95 D (range -0.25 to -2.00 D). Mean BCVA did not change or improved in 83.4% (preop log MAR $=0.10$ and postop log MAR $=0.11$) whereas five eyes (16.7%) lost 1 or 2 lines on the Snellen chart. Mean SE decreased from $+4.85$ D at baseline to 0.55 D, but overcorrection developed in 30% (mean: -1.10 D). In 46.6%, refraction was within ± 1.00 D and in 80% it was within ± 2.00 from target refraction. Eighteen eyes (66%) had grade 0 or 0.5 corneal haze but one eye had grade 3 and none developed grade 4.
- **Conclusion:** Hyperopic PRK has a low predictability for high hyperopia but it is effective for low hyperopia. Therefore, we do not recommend PRK in highly hyperopic eyes.

Two Decades of Corneal Transplantation: Indications and Associated Procedures

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- **Purpose:** This study was performed to identify the indications and associated procedures for corneal transplantation over a period of two decades.
- **Methods:** This study retrospectively reviewed the records of patients in Labbafinejed Medical Center who underwent corneal transplantation between 1987 and 2007. Corneal transplantation was performed by 6 anterior chamber ophthalmologists. Indications for surgery were summarized in 7 groups including: keratoconus, bullous keratopathy, microbial keratitis, graft failure, dystrophy, corneal scar and miscellaneous. Type of surgeries were divided into four groups including penetrating keratoplasty) PK (, lamellar keratoplasty (LTK), Descemet's Stripping Endothelial Keratoplasty(DSEK) and deep anterior lamellar keratoplasty (DALK).

Descriptive and frequency statistics, including means and standard deviation (SD) or percentages were calculated for presenting qualitative and quantitative variables as appropriate. The cases were analyzed regarding corneal transplantation indications and type of surgery using SPSS version 17.

- **Results:** From 3745 eyes undergoing penetrating keratoplasty, 65.4% were male and 34.6% were female. The mean age was 38 ± 20 years.

The causes of corneal transplantation were, in a decreasing order of frequency, keratoconus ($n=1187$, 31.7%), corneal scar ($n=936$, 25%), bullous keratopathy ($n=420$, 11.2%), corneal dystrophy ($n=393$, 10.5%), regraft ($n=275$, 7.3 %), miscellaneous ($n=275$, 7.3% (, and microbial keratitis ($n=259$, 6.9%).

The surgical procedures performed were PK, LK, DALK, and DSEK at a rate of 88.9%, 7.9%, 3% and 0.2%, respectively.

- **Conclusion:** Corneal transplantation is the most common transplant procedure worldwide. It seems that there is an increasing trend for corneal transplantation during these years which might be due to the growth in the number of tissue donors, higher technology, and willingness of ophthalmologists to operate poor prognosis patients.

Comparison of Central Corneal Thickness Measurement Using Ultrasonic Pachymetry, Rotating Scheimpflug Camera and Scanning Slit Topography

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- **Purpose:** Evaluation and comparison of central corneal thickness measurements using rotating Scheimpflug camera, scanning slit topography, and ultrasound pachymetry in virgin, healthy corneas.
- **Methods:** Central corneal thickness in 157 healthy eyes of 157 patients without ocular abnormalities other than refractive errors was measured, in a sequential order, once with rotating Scheimpflug camera and scanning slit topography and 3 times with ultrasound pachymetry as the last part of examination. All measurements were performed by a single experienced examiner. The results from scanning slit topography are given with and without correction for "acoustic correction factor" of 0.92.
- **Results:** The average measurements of central corneal thickness by rotating Scheimpflug imaging, scanning slit pachymetry, and ultrasound were 537.15 ± 32.98 μm , 542.06 ± 39.04 μm , and 544.07 ± 34.75 μm , respectively. The mean differences between modalities were 6.92 μm between rotating Scheimpflug and ultrasound ($p < 0.0001$), 2.01 μm between corrected scanning slit and ultrasound ($p = 0.204$), and 4.91 μm between corrected scanning slit and rotating Scheimpflug imaging ($p = 0.001$). According to Bland-Altman analysis highest agreement was between ultrasonic and rotating Scheimpflug pachymetry.
- **Conclusions:** In the assessment of normal corneas, rotating Scheimpflug topography measures central corneal thickness values with higher agreement to ultrasound pachymetry.

Time Trend and Prevalence of Second-Eye Senile Cataract Surgery during 2006-2008 in Labaffinejad Medical Center

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- **Purpose:** In the recent years the number of cataract surgeries has been raised globally and an increase in the rate of second-eye cataract surgery (SECS) plays a great role in that. Cataract surgery rate in Iran has doubled during 2000 to 2005 but there is no data on prevalence of SECS in Iran which in many studies showed a great benefit for patients. The aim of this study is to investigate the number of SECS in one of the high cataract surgery rate centers in Iran and evaluate the time trend and find out the differences by patient's age, gender, insurance and region of residence.
- **Methods:** In a retrospective computer-based survey the number of all senile cataract surgeries calculated during study period, among them we included whom were diagnosed senile cataract (ICD-10 code:H25.0-25.9) and consecutively operated only by ECCE or P.E procedures (ICD.9.CM code: 13.2 & 13.41) during 2006 up to 2008 and excluded under 30 years old patients. By systemic randomization we selected only 15% of that population in each year and their data retrieved, including: sex, age, residence area, type of surgery, date of operation, order of the operated eye (first or second eye) and the interval between two operations if there was any .proportion of SECS calculated for each year and the trend characterized through linear regression.
- **Results:** during 3 consecutive years (1385-87), 7562 senile cataract surgery performed in this center.53 patients excluded (<30y or operations other than P.E or ECCE) and we analyzed 1081(15%) cases. First eye surgery performed in 796 (73.6%) and SECS in 285 (26.4%; 95%CI: 23.7%-29.0%) patients. The proportion of SECS was increased from 25.2 % in 2006 to 28.3% in 2008, which was not statistically significant ($p=0.520$).51.6% of SECS performed in men. The mean age for SECS increased slightly from 67.10(SD: 10.38) to 68.58(SD: 11.23) years. The mean interval time between two operations was decreased significantly ($p=0.025$) during the study period, from 16.94 months to 12.65 months and it was independent to the age, gender, insurance and residence area ($p=0.034$) $B=-2.08$. The SECS proportion is significantly inflated independent to age, sex insurance and residence during study period.($B=0.179$ $P=0.021$)
- **Conclusion:** There has been a significant increase (1.5 times) in cataract surgery rate during this period. SECS rate showed a 1.12 times increase and this increase was dependent to age/sex/insurance/residence. Also the time interval between operations showed a 25.3% decrease which can somehow explains the growing rate of SECS in recent years in Iran.

Oxygen Therapy for Acute Chemical/Thermal Burns

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- **Purpose:** To evaluate the effects of systemic oxygen therapy in the management of acute ocular chemical and thermal burns.
- **Methods:** This prospective comparative case series was performed on patients with grade III to IV acute chemical and thermal burns. All patients received conventional medical therapy. Oxygen was started at the first 3 weeks after injury for the oxygen therapy group. They received 100% oxygen at a flow rate of 10 liters/min by simple mask for one hour twice daily for 14 days. Main outcome measures were healing of corneal epithelial defect and improvement of perilimbal ischemia. Secondary outcome measures included improvement of visual acuity, corneal transparency and vascularization, and complications.
- **Results:** Twenty four eyes of 22 patients (all male) were included. Thirteen eyes were in oxygen therapy group. Mean age of the patients was 27.58 ± 14.29 (6-49) years in oxygen therapy and 30.3 ± 10.3 (19-49) years in the control group. Mean follow-up period was 18.0 ± 9.27 (6-42) months in the oxygen therapy group and 18.36 ± 8.33 (7-37) months in the control group. Corneal epithelial defects healed within 15.23 ± 3.94 (10-21) days after oxygen therapy versus 59.9 ± 23.33 (28-95) days in control group ($P=0.00$). Vascularization of ischemic areas began within 3-4 days in all oxygen therapy cases and was completed in 14.54 ± 2.70 (10-21) days. In control group, it was completed in 45.09 ± 22.20 (25-105) days ($P=0.000$). In oxygen therapy group, cornea was more transparent and less vascularized 3 and 6 months after injury. At the end of follow-up, mean visual acuity (log MAR) was 0.40 ± 0.52 (0-1.3) and 1.11 ± 0.83 (0.1-3) in oxygen therapy and control groups, respectively ($P=0.018$). No patient developed symblepharon or corneoscleral melting in oxygen therapy group, while 3 patients developed symblepharon and 1 patient developed corneoscleral melting in control group.
- **Conclusion:** Oxygen therapy in acute phase of chemical or thermal burns is effective in improving limbal ischemia, accelerating epithelialization, increasing corneal transparency, and decreasing corneal vascularization. It also improves final visual acuity and reduces complications.

The Effect of Goldman Applanation Tonometry on Ocular Axial Length Measuring in Cataract Surgery Candidates in Zahedan (Alzahra Ocular Center)

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- **Purpose:** Cataract has a high prevalence around the world. An A-scan is often performed before the operation to measure the axial length and to calculate the IOL power. Since tonometry is commonly used before A-scan to measure IOP this study was conducted to evaluate any possible effect of Goldman Applanation Tonometry on the measurement of the axial length and miscalculation of IOL power.
- **Methods:** In this study 56 patients that were candidates for cataract surgery were randomly selected in AL Zahra ophthalmology hospital. Keratometry and A-scan were done in the eyes with cataract before and after performing tonometry.
- **Results:** the results showed that there was a significant difference between the axial length before and after tonometry ($p=0.046$). so that, after tonometry the average axial length decreased. Mean values for keratometry did not change significantly before and after tonometry ($p=0.806$).
- **Conclusion:** Decreased ocular axial length after performing Goldman applanation tonometry (GAT) may be due to the pressure of probes on corneal surface. Therefore, in order to calculate IOL power accurately it is better to perform A-scan at an appropriate time after tonometry. (Or in cataract extraction candidates, biometry has to be done before tonometry (GAT)).

The Incidence of Keratoconus in an Asian Population

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- **Purpose:** To determine the incidence of clinical keratoconus (KCN) in Yazd province.
- **Method:** In this population based cohort study, all new KCN suspect cases living in Yazd province (population size=990818) were registered and referred for topographic imaging during one year (2008-2009) by all local ophthalmologist and optometrists. Referral criteria included one or more of the following: positive family history, seasonal allergy, uncorrected astigmatism, best corrected visual acuity lower than 20/20, the presence of scissor reflex, Vogt striae, Fleischer's ring, or corneal thinning and abnormal keratometry results.
- **Results:** During the study period 685 patients were referred, 149 of which were excluded based on mentioned criteria. In addition, 28 patients did not show up for their topography session (95% response rate). The diagnosis of suspected or definite KCN was confirmed in 47.76% of participants (536 subjects), after reading topographic images and re-examined 85% of patients by anterior segment fellowships. Among re-examined patients, the number of subjects with "clinical", "early" and "suspect" KCN was 108, 72 and 20, respectively. In addition, 9 patients with PMD were classified in "Clinical KCN" group because of their obvious clinical signs. Among 39 patients not participating in the final clinical exam, based on their topographic images 32, 6 and one persons were classified in KCN, suspect and non-KCN groups, respectively (according to the fact that in 96% of re-examined patients, the topographic results were compatible with the clinical diagnosis). Consequently, the incidence of KCN in Yazd province was estimated 22.20 in 100,000 populations in one year. In view of life expectancy in Iran which is 72 years¹¹ and according to the starting age of KCN which is around 20 years old, the prevalence of this disease is estimated $1433=62 \times 23.11$ in 100,000 populations or 1.43%
- **Conclusion:** The incidence and prevalence of KCN in Yazd province is much higher than western countries and further attention to primary causes and the best ways for its management is recommended.

4

**POSTER
PRESENTATIONS**
Vitreous & Retina

Evaluation of Heart Struction and Function in Diabetic PATientsb with Non-proliferative Diabetic Retinopathy and CSME

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- **Purpose:** Evaluation of heart structure and function in diabetic patients with NPDR and CSME
- **Methods:** This study carries out as descriptive case serried 60 patients with non-proliferative diabetic retinopathyb and clinically significant macular edema were enrolled. Electrocardiography (ECG) and echocardiography were made for all patients to determine heart functional and structural changes.
- **Results:** 66.67% and 6.66% of patients had diastolic and systolic dysfunctions respectively 95% of patients were not aware of their cardiovascular condition.
- **Conclusion:** Cardiovasculr events are main cause of mortality in diabetic patients. Cardiovasculr involvement in these patients maybe asymptomatic or with minimal symptoms in may time. Establish guidelines for cardiovascular changes like what we do for diabetic retinopathy has great beneficial effect on management of cardiovascular complications due to diabetes mellitus.

Evaluation of Medical Follow-ups of Patients with Diabetic Retinopathy

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- **Purpose:** The aim of this study is to evaluate medical follow-up of patients with diabetic retinopathy.
- **Method:** In a descriptive cross-sectional design, patients with diabetic retinopathy, who had been referred for operation or laser therapy, were interviewed by an ophthalmologist and questionnaires were completed.
- **Result:** Of 100 patients with a mean age of 53 years, 65% were female and 35% were male. 50% of patients were non-graduated. 24% of patients had regular ophthalmologist follow-up and 75% of patients had no regular follow-up.

Causes of poor follow up were low awareness (42%), economical factors (12%), lack of family support (8%) and ophthalmologist unavailability (6%).
- **Conclusion:** It seems that a regional follow-up protocol for diabetes is needed to check the trend of quality of care of diabetes in Iran.

Assessment of the Relationship between Duration of Hydroxychloroquine Use and Visual Field defect Severity

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- **Purpose:** To describe the relation between duration of hydroxychloroquine use and severity of visual field defect.
- **Methods:** We designed a retrospective cross-sectional study to assess 201 patients. 97 patients were excluded from study and finally the study population included 104 patients.
- **Results:** From 104 eyes (patients), 71 eyes had normal visual field, 25 eyes had mild to moderate visual field defect, 12 eyes had moderate to severe visual field defect and only 6 eyes had very severe visual field defect. In this study we found that visual field defect is severe in patients that use drug in short duration.
- **Conclusion:** Severity of visual field defect does not increase with increase of the drug usage duration alone. Other factors can influence severity of visual field defect.

A Comparison of Success of Scleral Buckling with and without Retinopexy

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- **Purpose:** To compare the anatomical results of sclera buckle surgery with and without retinopexy in the management of phakic rhegmatogenous retinal detachment (RD).
- **Methods:** In this retrospective, nonrandomized, interventional, comparative case series, the data of 71 phakic eyes of 71 patients with rhegmatogenous RD that underwent scleral buckle surgery were evaluated. The surgeries in 41 consecutive eyes were accompanied by retinopexy performed either intraoperatively by transscleral cryotherapy (6 cases) or postoperatively by laser photocoagulation (35 cases). The next 30 eyes did not receive retinopexy. The primary outcome was retinal redetachment rate. The secondary outcomes were final visual acuity and the occurrence of cystoid macular edema and macular pucker.
- **Results:** The two groups were matched for age, sex, history of trauma or high myopia, and duration of RD before the surgery as well as the characteristics of the breaks and RD except for the RD extension which was larger in the non-retinopexy group. Retinal redetachment happened in 4 patients (13.3%) of the non-retinopexy group and in 6 patients (14.6%) of the retinopexy group. The difference was not statistically significant ($P>0.999$). Neither was the difference between the groups significant in terms of final visual acuity and the occurrence of cystoid macular edema and macular pucker.
- **Conclusion:** Retinopexy does not seem to have additional beneficial effects to the scleral buckle surgery for phakic rhegmatogenous RD in terms of both anatomical and functional success. However, this conclusion has to be confirmed in a randomized clinical trial.

Randomized Trial of Intravitreal Clindamycin and Dexamethasone versus Pyrimethamine, Sulfadiazine and Prednisolone in Treatment of Ocular Toxoplasmosis

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- **Purpose:** To compare the efficacy of intravitreal injection of clindamycin and dexamethasone with the classic treatment (pyrimethamine, sulfadiazine, and prednisolone) in treatment of ocular toxoplasmosis.
- **Methods:** A total of 68 patients with active ocular toxoplasmosis were randomly assigned to two treatment groups; 34 in the intravitreal clindamycin + dexamethasone (IVCD) group and 34 in the classic treatment (CT) group. The IVCD group received 1 to 3 injection(s) of 1 mg intravitreal clindamycin and 400 µg dexamethasone and the CT group received 6 weeks treatment with pyrimethamine/sulfadiazine plus prednisolone. Antitoxoplasmosis antibodies (Immunoglobulin M [IgM] and IgG) were measured using an enzyme-linked immunosorbent assay. Changes in retinochoroidal lesion size were measured by a computer program written in MATLAB environment, 6 weeks after initiation of treatment. Visual acuity (VA) changes, vitreous inflammatory response, adverse drug reactions, and rate of recurrence were secondary outcome measures.
- **Results:** The mean number of injections in the IVCD group was 1.6 (1 in 52.9%, 2 in 32.4%, and 3 in 14.7%). The lesion size reduction was meaningful after treatment in both groups. However, the difference in mean percentage of reduction at 6 weeks was not significant between two groups; $57.0 \pm 27.8\%$ in the IVCD versus $58.4 \pm 29.3\%$ in the CT groups ($P=0.569$). VA increased by 0.44 ± 0.24 and 0.29 ± 0.19 logMAR in the IVCD and CT groups, respectively ($P<0.001$); this difference was not significant. The interaction effect of IgM and treatment group on lesion size reduction was significant ($P = 0.002$); this indicated that IgM-positive cases responded better to classic and IgM-negative cases to IVCD treatment. Vitreous inflammation reduction was insignificant between the groups. Within 2 years, 4 (5.9%) eyes (2 in each group) had one episode of recurrences. Adverse drug reactions occurred in 2 patients of the CT group (skin rash and thrombocytopenia). No major injection-related complication was encountered in the IVCD group.
- **Conclusion:** Intravitreal injection of clindamycin and dexamethasone may be an acceptable alternative to the classic treatment in ocular toxoplasmosis. It may offer the patient more convenience, safer drug profile, greater availability, and less follow-up visits and hematologic evaluations.

Two-year Results of a Randomized Trial of Intravitreal Bevacizumab Alone or Combined with Triamcinolone vs. Laser in Diabetic Macular Edema

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- **Purpose:** To report the 2-year findings of a randomized clinical trial comparing intravitreal bevacizumab (IVB) injection alone or in combination with intravitreal triamcinolone acetonide (IVT) versus macular laser photocoagulation (MPC) as a primary treatment for diabetic macular edema (DME).
- **Methods:** The eyes were randomly assigned to one of the three study arms: the IVB group, patients who received 1.25 mg IVB; the IVB/IVT group, patients who received 1.25 mg of IVB and 2 mg of IVT; and the MPC group, patients who underwent focal or modified grid laser. Retreatment was performed at 12-week intervals whenever indicated. A 2-year follow-up data are presented.
- **Results:** Retreatment was required in 37 (94.9%), 27 (75.0%), and 31 (81.6%) eyes, respectively, in the IVB, IVB/IVT, and MPC groups up to 2 years. The difference in VA improvement among the groups was not significant after 24 weeks up to 2-years. However, the mean VA improvement was greater in the IVB group than the other groups and in the IVB/IVT group compared to the MPC group. The reduction of CMT was larger in the IVB group compared to the other two treatment groups; however, the difference among the groups was not statistically significant at any of the follow-up visits.
- **Conclusion:** In terms of vision improvement, the significant superiority of the IVB over the combined IVB/IVT and MPC treatment that had been observed at the week 24 did not sustain up to 2 years. This means that although IVB treatment may be a better choice than other two options in short term, the extent of this beneficial effect diminishes over time.

A Comparison of the Effect of Intravitreal Bevacizumab (Avastin) in Visual Acuity of Ischemic and Non-Ischemic Diabetic Macular Edema

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- **Purpose:** To evaluate the effect of ischemia in visual outcome after intravitreal injection of Avastin (Bevacizumab) for diabetic macular edema
- **Methods:** Patient with clinically significant macular edema (CSME) underwent fluorescein angiography (FA) Patient with fovea avascular zone (FAZ) larger than 100micrometer was considered to have ischemic macular edema. Patients were divided into two groups: ischemic and non-ischemic. Best corrected visual acuity (BCVA) and central macular thickness (CMT) were measured in all eyes with optical coherence tomography (OCT) at baseline. Subsequently, three intravitreal injections of Avastin (Bevacizumab) were done monthly. BCVA and CMT were measured one and three months after the third injection Data were compared between the two groups before and after injections.
- **Results:** 87 eye (66 patients), 23 (26.4%) ischemic and 64 (73.6%) non-ischemic were studied. In the non-ischemic group, BCVA improves from 0.653, 0.309 Log MAR to 0.404, 0.255(p value < 0.001). In the ischemic group BCVA did not change significantly (0.881, 0.332 to 0.879, 0.378; p value = 0.906). CMT improved in the ischemic group from 362.9, 34.66 to 278.76, 45.57 (p value < 0.001). In the non-ischemic group it changed from 353.47, 67.61 to 239.87, and 55.44 (p value < 0.001).
- **Conclusion:** Unlike significant reduction in CMT caused by intravitreal injection of Bevacizumab in both ischemic and non-ischemic groups, BCVA improved significantly in the non-ischemic group only and no changes were observed in the ischemic group.

Clinical Outcomes of Intravitreal Injection of Triamcinolone Vs Bevacizumab Vs Sham Treatment during Phacoemulsification on Diabetic Macular Edema

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- **Purpose:** To compare the results of IVT vs. IVB vs. sham injection at the end of phacoemulsification (PE) on diabetic macular edema (DME).
- **Methods:** In a randomized controlled trial 88 diabetic patients with at least moderate NPDR underwent one of the 3 injections, IVT (4mg), IVB (1.25mg) or sham at the end of PE. Patients were followed 1, 3, 6 and 12 months afterwards. Main outcome measures were change in BCVA and CMT during follow-up examinations.
- **Results:** Only in IVB group there were statistically significant improvements of BCVA at 1 (p=0.043) and 3 (p=0.034) months relative to the sham group. None of the changes in CMT between groups were statistically significant.
- **Conclusion:** IVB injection at the end of PE in patients with at least moderate NPDR results in additional visual improvement until 3 months after PE.

Intravitreal Bevacizumab in Retinal Vein Occlusion

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- **Purpose:** To describe the effects of intravitreal Bevacizumab injection (2.5 mg) on visual acuity, central macular thickness, central macular volume and retinal electrophysiology in the treatment of retinal vein obstruction induced macular edema.
- **Method:** Patients with retinal vein obstruction lasting less than three months and best corrected visual acuity 20/50 were included. OCT and multifocal electroretinography were performed at baseline and at monthly scheduled visits. Injections were repeated whenever there was increased macular edema or decreased visual acuity compared to the previous visit.
- **Results:** 21 eyes of 21 patients were included. Mean age of the patients was 58.71 ± 11.83 years (mean \pm SD). Mean number of injections was 2.14 ± 0.94 . Patients were followed up for at least 6 months (12 ± 5.3 months). Best corrected visual acuity improved from 1.2 ± 0.45 (Log MAR) at the baseline to 0.63 ± 0.45 at the final visit ($P < 0.001$). Central macular thickness improved from 488 ± 190 microns to 320 ± 155 microns ($P = 0.002$). Total macular volume improved from 10.029 ± 2.010 to 8.32 ± 1.7 ($P = 0.338$). Central macular volume improved from 0.38 ± 0.14 to 0.25 ± 0.12 ($P = 0.002$). In electrophysiologic parameters, in fovea the P1 implicit time improved from 4.3 ± 12.57 ms to 4.12 ± 5.15 ms ($P = 0.061$) and N1 implicit time changed from 2.18 ± 4.14 to 2.1 ± 5.87 ($p = 0.807$). No adverse reactions were seen.
- **Conclusion:** Intravitreal Bevacizumab is an effective and safe way to treat macular edema in retinal vein obstruction.

Intravitreal injection of Diclofenac in eyes with refractory Uveitic Macular Edema

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- **Purpose:** To evaluate the effect of a single dose of intravitreal diclofenac on visual acuity (VA) and central macular thickness (CMT) in patient with refractory uveitic cystoid macular edema (CME).
- **Methods:** In this prospective case series, 6 eyes of 6 patients with refractory CME secondary to chronic intermediate uveitis received intravitreal injection of diclofenac ($500\mu\text{g} / 0.1 \text{ ml}$).
- **Results:** Improvement of VA and CMT was not significant up to 12 weeks ($P = 0.216$ and $P = 0.814$, respectively).
- **Conclusion:** Intravitreal injection of diclofenac in eyes with refractory uveitic CME was not associated with a significant improvement in VA and CMT.

Effect of intracameral bevacizumab (Avastin) on the regression of NVI

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- **Purpose:** To evaluate the efficacy of intracameral Avastin injection on the regression of NVI.
- **Methods:** During one year, all patients with NVI who referred to Imam Khomeini Hospital were studied. Mono-ocular patients and patients with corneal opacity were excluded from the study. All patients underwent complete eye examination and F/A or B-scan. Based on the involvement of iris quadrants, a scoring system was designed: score 1, the presence of capillary tuft at papillary margin; score 2, involvement of each quadrant of iris, score 3 the presence of at least one vascular trunk longer than 1 quadrant. The sum of these numbers was considered as "NVI Score". Under topical anesthesia, 1.25mg/0.05 cc Avastin was injected into the anterior chamber. All patients were examined at 1, 3, 7, 14, 28, and 90 days after injection. This treatment was repeated after 2 weeks.
- **Results:** 24 eyes of 24 patients were studied. Before treatment, mean NVI score was 6.25 ± 2.55 and mean IOP was 34.7 ± 9.58 mmHg. Mean NVI score and IOP reduced on days 1, 3, 7, 14, 28, and 90. Minimum NVI score and IOP were detected on day 28. (NVI score = 1.16 ± 1.09) (IOP= 19.25 ± 2.78).

NVI score and IOP increased on day 90 compared with day 28. ($P=0.000$)($P=0.000$)

NVI score was not related to etiology and gender. Major complications such as endophthalmitis were not detected.

- **Conclusion:** Intracameral Avastin injection is effective for regression of NVI. Although some degree of recurrence developed in long term, the rapid effect and low toxicity of Avastin make this treatment a suitable adjuvant therapy.

Two-year Results of a Randomized Trial of Intravitreal Bevacizumab Alone or Combined with Triamcinolone vs. Laser in Diabetic Macular Edema

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- **Purpose:** To report the 2-year findings of a randomized clinical trial comparing intravitreal bevacizumab (IVB) injection alone or in combination with intravitreal triamcinolone acetonide (IVT) versus macular laser photocoagulation (MPC) as a primary treatment for diabetic macular edema (DME).
- **Methods:** The eyes were randomly assigned to one of the three study arms: the IVB group, patients who received 1.25 mg IVB; the IVB/IVT group, patients who received 1.25 mg of IVB and 2 mg of IVT; and the MPC group, patients who underwent focal or modified grid laser. Retreatment was performed at 12-week intervals whenever indicated. A 2-year follow-up data are presented.
- **Results:** Retreatment was required in 37 (94.9%), 27 (75.0%), and 31 (81.6%) eyes, respectively, in the IVB, IVB/IVT, and MPC groups up to 2 years. The difference in VA improvement among the groups was not significant after 24 weeks up to 2-years. However, the mean VA improvement was greater in the IVB group than the other groups and in the IVB/IVT group compared to the MPC group. The reduction of CMT was larger in the IVB group compared to the other two treatment groups; however, the difference among the groups was not statistically significant at any of the follow-up visits.
- **Conclusion:** In terms of vision improvement, the significant superiority of the IVB over the combined IVB/IVT and MPC treatment that had been observed at the week 24 did not sustain up to 2 years. This means that although IVB treatment may be a better choice than other two options in short term, the extent of this beneficial effect diminishes over time.

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**POSTER
PRESENTATIONS**
Oculoplastic &
Strabismus

Combined Maximum Levator Resection and Septal Sling in Correction of Severe Blepharoptosis with Poor Levator Function: A Novel Surgical Technique

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- **Purpose:** The aim of this study is to present a novel surgical technique in the management of severe blepharoptosis with poor levator function.
- **Methods:** Four patients (five eyes) were included in this study. Mean age of the patients was 15.3 years (range, 3-28 years). Preoperative levator function averaged 3.4 ± 0.9 mm. All the patients underwent combined maximum levator resection and septal sling in the ptotic eye.
- **Results:** The follow-up ranged from 4 to 10 months (mean, 8 months). Preoperative palpebral apertures averaged 4.4 ± 0.7 mm and postoperative apertures averaged 8.5 ± 0.4 mm ($P < 0.001$). There was marked improvement in the aperture (4.1 mm). The mean margin reflex distance-1 (MRD-1) was increased from 0 ± 1 preoperatively to 4.1 ± 0.4 postoperatively ($P < 0.001$). All the patients demonstrated symmetry of the upper eyelid position (less than 1 mm), good lid crease position, and acceptable cosmetic outcome. All the patients demonstrated some degree of lid lag and lagophthalmus. One patient developed exposure keratopathy associated with lagophthalmus which was treated successfully with lubrication.
- **Conclusion:** This preliminary study shows that this new technique may be a useful alternative in the management of severe blepharoptosis associated with poor levator function.

Inferior Turbinate Fracture and Congenital Nasolacrimal Duct Obstruction

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- **Purpose:** To evaluate the success rate of probing combined with inferior turbinate fracture in comparison with simple probing as a first attempt in the treatment of congenital nasolacrimal duct obstruction in children.
- **Methods:** In a prospective interventional case-control study, 86 eyes from 61 children older than 6 months with congenital nasolacrimal duct obstruction underwent surgical intervention. Forty-two eyes of 33 patients underwent probing combined with infracturing of the inferior turbinate and 44 eyes of 28 patients underwent simple probing. The outcome evaluation included a standard ophthalmologic examination plus a dye disappearance test 2 months after the surgical intervention.
- **Results:** In the case group (probing + infracture of the inferior turbinate), the results were good in 22 (66.7%) patients, fair in 8 (24.2%), and poor in 3 (9.1%). In the control group (simple probing), the results were good in 20 (71.4%) patients, fair in 3 (10.7%), and poor in 5 (17.9%) ($p = 0.9$). Success rates were 91% and 82% in the case and control groups, respectively ($p = 0.4$).
- **Conclusions:** Based on the results of this study, infracturing of the inferior turbinate does not increase the success rate of simple probing as a first attempt.

Report of 100 Cases Transconjunctival Lower Blepharoplasty

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- **Purpose:** To assess the complications arising from transconjunctival lower blepharoplasty (TCLB) performed by an eye plastic surgeon and related measures needed to be addressed during TCLB.
- **Methods:** All cases of TCLB (2003- 2007) were retrospective assessed in terms of associated procedures performed and postoperative complications including over and or under corrected fat removal (photograph assessment), eyelid retraction (margin-reflex distance measurement), rounding of lateral canthal angle (photograph assessment), ectropion (clinical examination), tear trough deformity (photograph assessment), chemosis (clinical examination) and watery eye (symptom assessment). Patients satisfaction (visual analogue score 0-10) was also recorded. Patients with less than 6 months follow up time, incomplete record and reoperation were excluded.
- **Results:** There were 82 women with mean age of 43.1 years (range: 23-78) and 18 men with mean age 50.3 years (range: 34-65). There were associated endoscopic forehead lifting and upper blepharoplasty in 32, internal brow lift and upper blepharoplasty in 23, direct brow lift and upper blepharoplasty in 3 men, and isolated upper blepharoplasty in 21 cases. Pinch skin excision in 38, medial fat repositioning in 69, canthal tendon tightening procedure in 26, lower retractor recession with and without spacer in 5, lateral drawer tarsorrhaphy in 3, and trans-eyelid SOOF elevation in 13 cases were performed during TCLB. Mean follow up time was 25.6 months (9 to 38 months). There were 7 eyelids with remaining fat pocket and 3 with overcorrected fat removal. 1-2.5 mm of lateral eye lid retraction was observed in 3 cases (2 without and 1 with pinch skin excision). Watery eye was observed in 28 cases, all had associated upper face procedure. Temporary chemosis was present in 11 eyelids. There were 13 eyelids with prominent tear trough deformity. No lateral canthal rounding and ectropion was evident. Mean subjective satisfaction was 93.5.
- **Conclusion:** TCLB does not affect the eyelid-globe position if the associated canthal tendon laxity, mid-face droopiness, eyelid retraction, tear trough deformity, and dry eye are addressed during the procedure.

Sensory and Motor Result of Vision Therapy/Orthoptics

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- **Purpose:** To determine the effect of 3 Months on VT/ O on VA, Streopsis and eye deviation of strabismic patients.
- **Methods:** In this interventional study, 40 children 3 to V years old with horizontal deviation were treated by one or more modalities of VT/ O for 3 months and their VA, streopsis and deviation were compared with initial parameters. The results were classified as excellent, good and bad after 3 months.
- **Results:** The difference of pre and post treatment VA, streopsis and deviation were all statistically significant ($p < 0.001$). The excellent, good and bad results were 17.5%, 27.5% and 55 % respectively compared to 0%, 5.1% and 94.9 % before VT/ O treatment.
- **Conclusion:** VT/ O are and effective and safe treatment for sensory and motor disorders in 3 to years old children.

The Success of Anterior Lamellar Recession in Treatment of Cicatricial Entropion with Abnormal Lash

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- **Purpose:** To evaluate the success of anterior lamellar recession in treatment of cicatricial entropion with abnormal lash.
- **Methods:** 51 lids of 31 patients underwent anterior lamellar recession. Primary success was evaluated and secondary surgeries were done to correct any residual entropion, lid margin abnormality and /or abnormal lash. Final and subjective success was evaluated.
- **Results:** 36 of 51 (70.6%) lids had primary anatomical success. 45 of 51 (89.1%) lids had final success. 46 of 51 lids (90.2 %) had subjective success. In primary success group the association of abnormal tarsal consistency with presence of trichiasis was significant, trichiasis recurred more in abnormal tarsus group (P. Value: 0.031). No significant association was observed between tarsal consistency and extent of lid involvement with primary success and final success.
- **Conclusion:** Anterior lamellar recession is an effective procedure for moderate to severe cicatricial entropion and lid margin abnormality if appropriate patient selection is done.

Evaluation of Refractive State in Patient with Congenital Nasolacrimal Duct Obstruction

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- **Purpose:** To evaluate the refractive state of patients with unilateral congenital nasolacrimal duct obstruction and the presence of any anisometropia.
- **Methods:** This is a descriptive prospective study. Patients with unilateral congenital nasolacrimal duct obstruction who were referred in a two year interval entered this study. An examination under anesthesia was performed and cycloplegics refractive state of the eyes was checked before performing the appropriate surgery (probing, silicon intubation or dacryocystorhinostomy) was performed. When more than one surgery was needed only the first refraction was entered in the study. Refractive states of two eyes were compared and anisometropia more than 0.5 diopter was considered.
- **Results:** 94 patients with mean age of $27.3 \pm SD$ (range 6 month to 10 years) were entered in the study from May 2007 to January 2010. The affected eye of each patient was compared with the normal eye of the same patient. This study showed that with increase in age prevalence of signs secondary to nasolacrimal obstruction like discharge increased even though not statistically significant ($r=0.115$ & $P=0.270$). Spherical equivalent in 78 eyes affected (%83) was hyperopic, in 8 eyes (%8.5) was myopic and in 8 eyes (%8.5) was emmetropic. These figures in non affected eyes were 67 eyes (%71.3), 22 eyes (%23.4) and 5 eyes (%5.3), respectively. Prevalence of anisometropia more than 0.5D was %25 and less than 0.5D was %43; no anisometropia was found in %32 of patients. When the affected eye was hyperopic, the difference between affected and non affected eye was significant from spherical ($P<0.001$) and spherical equivalent ($P<0.001$) stand point but when affected eye was myopic or emmetropic these differences were not statistically significant. When all patients regardless of type of refractive errors were compared the difference between affected and non affected eyes were significant from spherical and spherical equivalent stand points ($P=0.003$ for both) but from cylindrical ($P=0.17$) and axis ($P=0.22$) stand point they were not significant. By increasing each month to the patient's age mean difference in sphere between two eyes increased by 0.007D; this increase was statistically significant ($P=0.019$). For the cylinder, this change in difference was negative and not significant ($P=0.019$) and for spherical equivalent it was positive but not significant ($P=0.137$). By increasing age of referral, number of surgeries needed to treat the patients significantly increased ($r=0.297$, $P=0.004$). Mean number of operations was 1.2 ± 0.5 times for treatment before 2 years old and it was 1.6 ± 0.8 operations after 2 years ($P=0.006$).
- **Conclusion:** By increasing age at presentation anisometropia increases and the number of surgery to relieve the obstruction increases. On the other hand, anisometropia especially, anisohyperopia, in older age group are more difficult to treat because anisohypopia is more common in these patients. Early refraction and intervention help to prevent amblyopia and may reverse the anisometropia.

Methylenetetrahydrofolate Reductase Gene Polymorphism and Homocysteine Levels in Patients with Pseudoexfoliation and Pseudoexfoliation Glaucoma in Southern Iran

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- **Purpose:** Pseudoexfoliation (PEX) syndrome leads to elevated intraocular pressure and consequent glaucomatous damage of the optic nerve. This study was performed to investigate the frequency of MTHFR, 677 C-T polymorphism and homocysteine (Hcy) levels in Iranian patients with PEX and PEX glaucoma compared to normal population.
- **Methods:** Thirty four patients with PEX, 27 with PEX and glaucoma, and 32 control subjects were enrolled. Pregnant patients with any systemic disorder such as hypertension and diabetes mellitus, usage of vitamin supplements or any condition affecting homocysteine levels were excluded. Fasting total homocysteine (tHCT) levels of all the participants were determined, using an ELISA method and values exceeding 14 micromole /L were considered elevated. MTHFR genotyping was performed by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). Genotyping of polymorphism was done with polymerase chain reaction.
- **Results:** The patients' mean age was 67 years (range 50-90 years) in all three groups and the male to female ratio was 2:1. The mean plasma homocysteine level was 13.95 ± 8.7 in the PEX, 16.37 ± 8.2 and 14.22 ± 11.32 in the PEX glaucoma and the control group, respectively. The rate of C677T polymorphism was 44% in the PEX, 52% in the PEX glaucoma, and 40% in the control group.
- **Conclusion:** The result of this study implies that neither C677T polymorphism nor hyperhomocysteinemia can be considered as major risk factors for PEX or PEX glaucoma in Iranian population.

Superior Oblique Tendon Elongation with Fascia Lata

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- **Purpose:** Superior oblique lengthening with a silicone retinal band is used to treat superior oblique overaction (SOOA); however, secondary infection, implant extrusion, orbital cellulitis, and adhesion may occur. We present a method of superior oblique tendon elongation in which autogenous fascia lata is used to decrease the likelihood of these complications.
- **Methods:** Six patients (5 female, 1 male) aged 7 to 22 years (mean, 17 years) with 40-85 exotropia and SOOA (range, +2 to +4; mean, +3.5) underwent bilateral superior oblique lengthening with insertion of fascia lata. In the last 2 cases, the values of elongation were augmented by 2 mm. Fascia lata was harvested through a linear incision on the lateral aspect of the patients' thigh.
- **Results:** Postoperatively, correction of A-pattern exotropia to within 10 was achieved in 66% of the cases as well as correction of SOOA to within +1 in 58% of the cases, with a follow-up of 9 months. All patients with +2 to +3 SOOA (3 cases) were fully corrected, whereas those with +4 SOOA (9 eyes) had residual overaction of +1 to +3. In the 4 eyes with augmented elongation, residual SOOA was between 0 and +2. No patient developed superior oblique palsy.
- **Conclusions:** Autogenous fascia lata may be used as an alternative to silicone band for superior oblique lengthening. Our results were comparable with published results for the silicone band, with a lower rate of overcorrection. The improved biocompatibility reduces the likelihood of complications compared to a silicone band.

Determination and Comparison of the Exophthalmometry Values in Upright and Recumbent Positions

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- **Purpose:** To determine normal values for Hertel exophthalmometry in upright and recumbent position in resident population of Bandar-Abbas in south of Iran.
- **Methods:** In a population-based epidemiological study, ocular protrusion was measured in 447 randomly selected normal residents of Bandar-Abbas. Hertel exophthalmometry was performed in all by a single ophthalmologist in both upright and recumbent positions.
- **Results:** 447 normal subjects were examined. The age range was 19 month to 80 years (20.65, SD=15.06 year). Two hundred and thirty nine (54.69%) of subjects were male. Mean absolute exophthalmometric value was 12.20 mm (+/-1.98) in upright position and 12.01 mm (SD=2.06) in recumbent position. Generally, asymmetry between upright and recumbent position was not statistically significant for either the right (upright=12.25 mm, recumbent=12.03 mm, p=0.088) or the left eye (upright=12.17 mm, recumbent=11.98 mm, p=0.855). Difference of exophthalmometric values between right and left eye was less than 2 mm in all subjects.
- **Conclusions:** Exophthalmometric values should be interpreted according to ethnicity and age of subjects. Generally the amount of globe protrusion doesn't change significantly in upright and recumbent positions.

Autorefractive vs. Photorefractive

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- **Purpose:** To compare the accuracy of non-cycloplegic photorefractive with cycloplegic refraction in refractive error screening programs for children and to determine beneficial cut points for such screening.
- **Methods:** In this diagnostic test study, right eyes of 191 children between 1 to 14 years were included. Non-cycloplegic photorefractive followed by cycloplegic refraction were performed for all cases. Based on the cycloplegic refraction results, the eyes were classified into three groups regarding the spherical component: emmetropia (between -1 and +2.5 Diopter [D]), myopia (-1 D) and hyperopia (+2.5 D); and into two groups regarding the cylindrical component: <1.5 and 1.5 D of astigmatism. The results of the two methods were compared using the paired t-test and Pearson correlation coefficient. The sensitivity and specificity of the non-cycloplegic photorefractive method were evaluated as well as their corresponding optimal cut points by ROC curve analysis.
- **Results:** The means of spherical power, cylindrical power and spherical equivalent measured by the two methods were statistically correlated (0.75, 0.86, and 0.76, respectively, $P < 0.001$ for all). The differences of the mean spherical power in the eyes within the myopic and both astigmatic ranges were not statistically significant between the two methods; however, the mean spherical power of the eyes within the hyperopic range was significantly different ($P < 0.001$) being higher in cycloplegic refraction (4.60 ± 2.23 D) than in the non-cycloplegic photorefractive (2.77 ± 1.48 D) method. Considering cycloplegic refraction as the gold standard, the specificities measured for non-cycloplegic photorefractive were more than 90% in all refractive error ranges and the sensitivities were also acceptable (80%) in the myopic and astigmatic ranges. Nevertheless, the sensitivity for hyperopia detection was 56.4%. The cut points for the spherical powers of +2.5 D and cylindrical power of -1.5 D were 1.88 D and 1.12 D, respectively.
- **Conclusion:** Non-cycloplegic photorefractive is a relatively accurate method for myopia and astigmatism detection in children. Using the optimal cut points measured in this study, it could be considered as an acceptable tool for hyperopia detection as well. Therefore, non-cycloplegic photorefractive can be used for refractive error and amblyopia screening programs.

Evaluation of Scintigraphic Results in Patients with Functional Nasolacrimal Duct Obstruction

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- **Purpose:** It appears from the literature that no standardized examination exists for patients with functional nasolacrimal duct obstruction. The purpose of this study is to assess the role of lacrimal scintigraphy in these patients.
- **Method:** Patients who were clinically diagnosed with unilateral or bilateral functional nasolacrimal duct obstruction were prospectively entered into the study. Dacryoscintigraphy was performed in all eyes
- **Results:** 48 eyes from 24 patients (including 37 eyes with epiphora) were assessed in this study (mean age was 54.6 ± 9.9 years). From these 7 (28%) were men and 18 (72%) were female. In 83.7% of all patients with epiphora (37 eyes) dacryoscintigraphy showed abnormality, and in 45.4% patient without epiphora (11 eyes) it was also abnormal. Diagnostic accuracy of scintigraphy was 77.7%. PPV, NPV and specificity of scintigraphy were 86.1%, 50% and 54.6%, respectively.
- **Conclusions:** More than one lacrimal test maybe required for a definitive diagnosis in patients with epiphora due to functional nasolacrimal duct obstruction. Dacryoscintigraphy has no added benefit in these patients as a routine test ,but in selected cases with equivocal results or cases who are candidates for surgery it is valuable for determining the level of obstruction to guide surgery.

Augmented Recession by Intraoperative Botulinum Toxin-A Injection in Large-Angle Horizontal Deviation

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- **Purpose:** The aim of this study is to evaluate the effectiveness of intraoperative botulinum toxin-A (BTA) injection as an adjunct to the surgical treatment of large-angle esotropia or exotropia.
- **Methods:** Thirteen patients were included in this interventional case series. Mean age of the patients was 23.31 ± 13.29 years (range: 5-43 years). Of these 13 patients, 6 were exotropic and 7 were esotropic. The average preoperative esodeviation was 79.29 ± 16.44 prism diopters (PD) (range: 60-100 PD) and exodeviation was 75.83 ± 11.14 PD (range: 65-90 PD). Depending on the degree of deviation, ten or twenty units of Dysport were injected intraoperatively into the recessed horizontal rectus muscles in all of the patients.
- **Results:** The average follow-up was 7 ± 1 months (range: 6-8 months). The average final deviation in the esotropia group was 8.57 ± 10.69 PD of esotropia. The average final deviation in the exotropia group was 14.17 ± 12.00 PD of exotropia. The final deviation of the 69% patients was within 15 PD of esotropia or exotropia.
- **Conclusion:** This study shows that the combination of BTA injection with recession may be a useful treatment option in cases of large-angle horizontal deviation.

The Role of Botulinum Toxin in the Management of Acute Traumatic Third Nerve Palsy

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- **Purpose:** To study the effect of botulinum toxin injection in the management of paralytic exotropia resulting from acute traumatic third (oculomotor) nerve palsy.
- **Methods:** Nine patients with acute traumatic partial third nerve palsy of less than 2 months duration were treated with injection of botulinum toxin A into the ipsilateral lateral rectus muscle. The horizontal deviation angles before and after the injections were recorded. A distance exotropia of less than 10(Delta) or absence of diplopia in the primary position at the last follow-up was defined as recovery.
- **Results:** The mean pre-injection deviation in the primary position was 48.3 (Delta) of exotropia, and the mean post-injection deviation in the primary position was 14.2(Delta) at the last follow-up. Seven patients experienced recovery and regained single binocular vision in the primary position. The overall recovery rate was 77.8%. Two patients did not recover and subsequently underwent strabismus surgery.
- **Conclusions:** Patients with acute traumatic partial third-nerve palsy treated with injection of botulinum toxin A in the lateral rectus muscle showed marked recovery when injection was performed within 2 months of the onset of palsy. Botulinum toxin injection into the lateral rectus muscle may provide temporary relief of symptoms in some patients and seems to be a useful treatment option in cases of acute traumatic third nerve palsy in the short term.

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به نام خدا

با تعمیق رو به گسترش دانش پزشکی به سطوح سلولی و مولکولی، برقراری ارتباط بین تحقیقات علوم پایه و پژوهش‌های بالینی امری است اجتناب ناپذیر و بدون برقراری چنین تعاملی، پیشرفت واقعی در عرصه های علمی رخ نخواهد داد. شناخت دقیق تر از مکانیسم واقعی بیماری ها، امکان دستیابی به درمان های جدید و مؤثر را فراهم و راه را بر روی مداوای بیماری هایی که در حال حاضر لاعلاج به نظر می رسند می‌گشاید. در این راستا، برقراری ارتباط ارگانیزه بین پژوهشگران علوم پایه و متخصصین علوم بالینی امری کاملاً ضروری به نظر میرسد. به همین دلیل، از سالها پیش در بسیاری از کشورهای جهان تشکیلاتی با هدف هماهنگ کردن مطالعات علوم پایه و علوم بالینی ایجاد و این امر در حال گسترش است. ایده ایجاد ارگانی با اهداف ذکر شده در ایران از حدود دو سال قبل توسط مرکز تحقیقات چشم دانشگاه علوم پزشکی شهید بهشتی مطرح و با هماهنگی با سایر مراکز تحقیقات چشم پزشکی و تعدادی از اساتید علوم پایه پیگیری گردید. این امر در حال حاضر به مراحل تعیین کننده نزدیک و ارگان مذکور تحت عنوان Iranian Research Association for Vision & Ophthalmology (IRAVO) در حال شکل گیری است. یکی از برنامه‌های اصلی IRAVO برگزاری گردهمایی های سالیانه می باشد و «همایش تحقیقات چشم پزشکی و علوم بینائی ایران» در واقع اولین گردهمایی این مجموعه محسوب می گردد. در اینجا جا دارد که از جناب آقای دکتر جعفری‌نسب دبیر محترم علمی و جناب آقای دکتر ضیائی دبیر محترم اجرائی و همچنین از سرکار خانم دکتر خیام زاده مسئول محترم دبیرخانه همایش و تمامی اعضای کمیته‌های علمی و اجرائی و اساتیدی که زحمت نقد مقالات را پذیرفته اند سپاسگزاری کنم. امیدوارم که با ادامه مشارکت فعالانه پژوهشگران محترم شاهد گسترش هر چه بیشتر کیفی و کمی همایش‌های آینده باشیم.

دکتر حمید احمدیه
رئیس همایش

به نام خداوند علم و خرد

پیشرفت و توسعه هر علمی مرهون تحقیقات و پژوهش در آن علم می باشد و صرف انتقال اندوخته ها و تجربه ها ارتقاء علمی را به همراه ندارد. لذا به هر میزان که به تحقیقات در هر زمینه ای بهاء داده شود، پیشرفت علمی در آن زمینه سریعتر و وسیعتر خواهد بود. هر چند هر ساله کنگره ها و سمینارهای متعدد در مورد چشم و بیماریهای آن در قالب سمپوزیوم و کارگاه ها برگزار می شود ولی تحقیقات چشم که پایه و اساس دستاوردهای جدید می باشد کمتر در این سمینارها مورد توجه قرار می گیرد. جهت توجه بیشتر به این امر مهم و رفع این کمبود با همت جناب آقای دکتر احمدیه و مراکز تحقیقات چشم پزشکی ایده برگزاری همایش سالیانه جهت ارائه تحقیقات انجام شده در زمینه چشم پزشکی و علوم بینائی مورد توجه قرار گرفت که اولین همایش آن با میزبانی مرکز تحقیقات چشم دانشگاه علوم پزشکی شهید بهشتی در شرف برگزاری می باشد. نظر به محدود بودن فرصت و نداشتن تجربه قبلی قطعاً این همایش با کاستی هائی همراه است که در همایش های بعدی در رفع آنها تلاش خواهد شد. اهمیت این همایش شروع تلاشی است که در عرصه سمینارها و کنگره های چشمی در ایران جای خالی آن محسوس می‌باشد.

در پایان از حسن اعتماد، هدایتها و تلاشهای استاد ارجمند آقای دکتر احمدیه و همراهی و همفکری روسای محترم مراکز تحقیقاتی و مدیران محترم گروه چشم سراسر کشور، اعضای کمیته علمی و اجرائی به ویژه سرکار خانم دکتر خیام زاده و هیأت داوران که در امر برگزاری این همایش ما را یاری نمودند صمیمانه تشکر می نمائیم.

دکتر حسین ضیائی
دبیر اجرائی همایش

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دبیر علمی همایش



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