

## Comparison of Snellen acuity and objective assessment using the spatial frequency sweep PVER

*GRAEFE'S ARCH CLIN EXP OPHTHALMOL (1997), 235: 442-447.*

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*Background:* We compared the vision objectively assessed by spatial frequency sweep pattern-reversal visual-evoked response (SPVER) with the Snellen acuity in patients.

*Methods:* SPVER acuity and Snellen acuity were measured in 100 patients with various ocular pathologies, including macular diseases, diffuse retinal degeneration, optic nerve diseases, glaucoma, and high myopia. For SPVER, 10 sinusoidally modulated vertical gratings were presented as stimuli. The responses were averaged and displayed through the discrete Fourier transform on the monitor display. The PVER acuity was determined by extrapolating the SPVER amplitude-spatial frequency function to baseline.

*Results:* Vision ranged from 20/15 to 20/400 with Snellen acuity and from 20/25 to 20/190 with SPVER. The overall correlation between the two acuities was  $r = 0.666$ . The correlation varied from  $r = 0.895$  in eyes with glaucoma to  $r = 0.436$  in eyes with optic nerve disease. Seventy-seven eyes (77%) had a visual acuity agreement of within 1.0 octave between the two measurements.

*Conclusions:* The SPVER acuity and the Snellen acuity correlated to a certain degree. Discrepancies were found in certain diseases, with the highest disparity in patients with optic nerve disease. We conclude that the SPVER is a effective in estimating vision objectively, particularly in patients in whom the standard Snellen test is impossible to perform or yields unreliable results.

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## Phenotypic analysis of resident lymphoid cells in the conjunctiva and adnexal tissues of rat

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The conjunctival associated lymphoid tissue is considered to be an integral part of the mucosal immune system. Under normal circumstances immune mechanisms in mucosal associated lymphoid tissue of the gut and bronchus can selectively, rather than enhance, immune responsiveness to encountered antigens, inducing a state of tolerance. It is possible that conjunctival associated lymphoid tissue can also induce a state of tolerance to encountered antigens. Such a response may be exploited to modulate immune mediated ocular disease. Enhanced tolerance may protect the host against foreign antigen. Alternatively, under certain circumstances when the normal immune system is altered or disrupted the mucosal tissue may act to induce sensitisation and trigger immune mediated disease.

The rat is frequently used as an animal model of immune

mediated eye disease, but the normal profile of immune cells in the rat conjunctiva has not been studied. This information is essential for meaningful interpretation in the experimental situation. In this study we examined the immunophenotype of lymphoid tissue associated with the conjunctiva, lacrimal gland and Harderian gland of the Lewis rat.  $CD4^+$ ,  $Ia^+$  and the monocyte/macrophage population of cells were found predominantly in the substantia propria of the conjunctiva and interstitial connective tissue of the glands.  $CD8^+$  cells were distributed mainly in relation to the conjunctival and glandular epithelium. Goblet cells stained strongly with the monoclonal antibody (MAb) MRC OX-39, which is a marker for IL-2 receptors. The overall pattern of distribution of immunocompetent cells in the rat was found to be similar to that reported in humans.

## Corneal topography after selective suture removal for astigmatism following keratoplasty

OPHTHALMIC SURG LASERS 1997; 28: 208-214.

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*Background and Objective:* The authors sought to determine whether the immediate corneal topographic changes induced by selective suture removal for astigmatism after keratoplasty were stable over time.

*Patients and Methods:* Computerized videokeratographic images were obtained prior to and immediately following suture removal in 14 patients, and the again at the next postoperative visit 4 to 6 weeks later. These images were analyzed and statistically compared for corneal power and vector of the central 3-mm corneal astigmatism.

*Results:* Most of the topographic changes induced by suture removal occurred immediately. However, continued shifting in corneal curvature did take place over the subsequent 4 to 6 weeks. Unpredictable shifts were more pronounced in patients whose surgery had been performed more than 20 months prior to suture removal.

*Conclusion:* Computerized videokeratography graphically elucidates continued shifts in corneal topography following the removal of sutures for the control of astigmatism after keratoplasty.

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## Retrovirus-mediated suicide gene transduction in the vitreous cavity of the eye: feasibility in prevention of proliferative vitreoretinopathy

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In proliferative vitreoretinopathy (PVR), retinal pigment epithelial cells, fibroblasts, or other proliferating cells form contractile membranes in the vitreous cavity of the eye, resulting in traction retinal detachment. Retroviral vector-mediated transfer is a suitable method to transduce the herpes simplex virus thymidine kinase (HSV-*tk*) gene into proliferating cells in PVR, allowing for the selective killing of these cells. To determine the potential of gene transduction in the environment of the vitreous cavity, we evaluated the effect of vitreous humor on retroviral vector-mediated gene transduction of rabbit dermal fibroblasts *in vitro* and studied *in vivo* transduction in rabbit experimental PVR with retroviral vector G1BgSvNa. In addition, we studied the bystander effect *in vitro* and *in vivo* in a rabbit model of PVR, with low percentages of HSV-*tk*-positive cells. Finally, we evaluated the efficacy of intravitreal administration of HVS-*tk* retroviral vector G1TkSvNa

followed by ganciclovir (GCV) in the prevention of experimental PVR. Vitreous humor reduced gene transfer efficiency *in vitro* in a dose-dependent manner. *LacZ* expression was found in cells of preretinal or intravitreal membranes of animals of both *in vivo* and *in vitro* transduction groups; however, *in vivo* transduction resulted in a decreased number of transduced cells, with a relative transduction efficiency of approximately 2%. Transduction of HSV-*tk* was associated with a powerful bystander effect both *in vitro* and *in vivo* with significant effects even when HSV-*tk*-positive cells represented only 1% of the population. *In vivo* transduction with G1TkSvNa followed by GCV significantly inhibited the development of PVR ( $p < 0.05$ ). These results suggest that retroviral vector-mediated transfer of HSV-*tk* into the proliferating cells in PVR may be feasible and may provide a novel therapeutic strategy for this disease.

# Post-traumatic proliferative vitreoretinopathy The epidemiologic profile, onset, risk factors, and visual outcome

OPHTHALMOLOGY 1997;104:1166-1173

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*Purpose:* The purpose of the study was to characterize the clinical development of proliferative vitreoretinopathy (PVR) after trauma in the human eye.

*Methods:* A chart review was performed on the records of 1564 patients with ocular trauma seen at a large metropolitan hospital. The frequency, type of ocular trauma, time to onset, potential risk factors, and visual outcome for PVR were evaluated.

*Results:* Proliferative vitreoretinopathy occurred in 71 (4%) of 1654 injured eyes. Of these 71 injured eyes, 30 (42%) resulted from rupture, 15 (21%) from penetration, 13 (18%) from perforation, and 7 (10%) from contusion. Six (9%) were associated with an intraocular foreign body (IOFB). The frequency of PVR following perforation, rupture, penetration, IOFB, and contusion was 43%, 21%, 15%, 11%, and 1%,

respectively. Overall, those eyes that developed PVR had a poorer visual outcome, with PVR being the primary reason for visual loss. The time from injury to onset of PVR was shortest after perforation (median, 1.3 months), followed by rupture (2.1 months), IOFB (3.1 months), penetration (3.2 months), and contusion (5.7 months). Vitreous hemorrhage was the strongest independent predictive factor for the development of PVR. A long, posteriorly located wound and persistent intraocular inflammation were also important risk factors for PVR.

*Conclusions:* These results suggest that PVR is a common complication following a variety of ocular injuries, and that it is associated with a poor visual outcome. Its frequency, onset, and outcome are strongly dependent on the nature of the trauma. Specific high-risk groups are identified as candidates for more aggressive therapy.

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## A system for classifying mechanical injuries of the eye (globe)

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*Purpose:* To develop a classification system for mechanical injuries of the eye.

*Methods:* The Ocular Trauma Classification Group, a committee of 13 ophthalmologists from seven separate institutions, was organized to discuss the standardization of ocular trauma classification. To develop the classification system, the group reviewed trauma classification systems in ophthalmology and general medicine and, in detail, reports on the characteristics and outcomes of eye trauma, then established a classification system based on standard terminology and features of eye injuries at initial examination that have demonstrated prognostic significance.

*Results:* This system classifies both open-globe and closed-globe injuries according to four separate variables: type

of injury, based on the mechanism of injury; grade of injury, defined by visual acuity in the injured eye at initial examination; pupil, defined as the presence or absence of a relative afferent pupillary defect in the injured eye; and zone of injury, based on the anteroposterior extent of the injury. This system is designed to be used by ophthalmologists and nonophthalmologists who care for patients or conduct research on ocular injuries. An ocular injury is classified during the initial examination or at the time of the primary surgical intervention and does not require extraordinary testing.

*Conclusions:* This classification system will categorize ocular injuries at the time of initial examination. It is designed to promote the use of standard terminology and assessment, with applications to clinical management and research studies regarding eye injuries.