

MAILBOX

Allo-limbal transplantation in patients with limbal stem cell deficiency

EDITOR,—We read with great interest the recent article by Dua and Azuara-Blanco,¹ describing the use of a new immunosuppressive agent FK-506 in patients receiving allo-limbal transplantation. The authors also describe a modified surgical approach. Although FK-506 appears to be a safe and effective treatment option in these patients, the follow up is longer than 1 year in only two of the six patients. These two patients experienced a limbal graft rejection episode in the postoperative period and we therefore feel that longer follow up is necessary before the efficacy of FK-506 can be properly established. It would also be interesting to compare FK-506 with cyclosporin A in future studies to assess the relative safety and efficacy of the two drugs.

The potential advantage of HLA matching was cited in the discussion by the authors. Although a recent study² indicates that HLA matching may not totally obviate the need for immunosuppression, we believe that it will allow reduction of dosage and or duration of treatment with these potentially toxic drugs. In countries with a paucity of corneal donor tissue, where even hepatitis B positive donor tissue is sometimes used,³ live related donor tissue is a valuable source of stem cells. However, the modified surgical technique described by the authors¹ would not be suitable for live related transplantation, as extent of tissue excision would prove detrimental to the donor eye.

We concur with the authors that adequate reconstitution of the ocular surface microenvironment is critical to the success of limbal transplantation procedures. We feel that the use of amniotic transplantation⁴ would have helped achieve this goal during surgery. We feel also that there are still many unanswered questions in limbal grafting for ocular surface reconstruction including the best surgical approach, the optimum amount of limbal stem cell transfer, the ideal microenvironment for survival of the transplanted limbal cells, the usefulness of HLA matching, and the role of newer immunosuppressive agents like FK-506. We suggest that before new information is available, the use of HLA matched live related limbal tissue, combined with amniotic membrane transplantation and long term immunosuppression of the recipient would be a viable option in the treatment of advanced ocular surface disease.

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Reply

EDITOR,—The authors have commented on the use of FK-506 as an immunosuppressive agent in patients with allo-limbal transplantation. Our experience with tacrolimus (FK-506, Prograf, Fujisawa Ltd, London) has been very good thus far. Since publication of the report, several of our patients have been followed for over 1 year now. Attempts to reduce FK-506 (with a view to stopping treatment) have resulted in rejection reactions in two patients (one more since publication of the paper), but resolved on increasing the dose. Young *et al* have expressed concern over the two patients who had developed rejection while on treatment with FK-506. They have interpreted this as implying poor efficacy of the drug. While we agree that the efficacy of this drug does need to be evaluated over a longer period of time, it needs to be emphasised that in one of these patients, where a rejection reaction was observed 4 months after transplantation, it corresponded with a very low trough level of the drug and responded to an increase in the drug dose. The second patient experienced rejection after stopping the drug, 13 months post-surgery and responded to reinstating FK-506 therapy. Thus, in both instances it was not the efficacy of the drug that was in question. A third patient (patient 3)¹ had a similar experience on reducing drug dosage, 18 months post-surgery, emphasising the need for long term treatment with immunosuppressive agents.

We have also used this drug in the treatment of several "high risk" corneal transplants with excellent results (unpublished observations). Young *et al* have suggested a prospective comparison of FK-506 with cyclosporin. Our preliminary experience with the two drugs, in the treatment of endogenous posterior uveitis, showed some advantages of FK-506 over cyclosporin.² In theory, however, both drugs should be effective and should perhaps be used in a complementary manner, if onset of side effects with one drug dictate cessation of therapy.

There is no doubt that the use of HLA matched material from living related donors will provide the advantages of "fresh tissue" and "matched tissue". Unfortunately, however, not all patients have willing, living related donors. When cadaveric limbal allografts have to be used, the advantage of "freshness" is preferred over the potential benefit of a "close or near match" and the associated delay. Tsubota *et al*³ have, however, shown that preserved (Optisol GS medium) tissue can be successfully used for limbal allografts.

Our technique (modification) is clearly designed for cadaveric material. There was never the suggestion that it should be employed for living related donors. Our belief is that, as for auto-limbal grafts, no more than 4 clock hours of limbal tissue should be harvested from any one eye of a living donor.⁴

This figure is admittedly empirical, and further experience with this technique is needed for more definite information.

Finally, in the last paragraph, Young *et al* contradict themselves by, firstly, rightly pointing out the present limitations of limbal transplantation procedures and then making a very definitive statement in proposing use of HLA matched live related limbal tissue, combined with amniotic membrane transplantation and immunosuppression as a viable option. Amniotic membrane transplantation combined with limbal transplantation has been shown to give good results⁵ but there is no evidence to show that it is superior to any technique the does not employ the use of this membrane. Controlled randomised studies are also needed to sort out this issue.

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Limbal allografting using FK-506

EDITOR,—While we agree with Dua and Azuara-Blanco¹ that the use of "fresh" donor eyes for limbal transplantation is preferable, social and surgery scheduling limitations may force surgeons to use stored corneoscleral (C-S) rims. Tsubota *et al*² have demonstrated the viability of limbal stem cells (SCs) harvested from C-S rims stored in Optisol GS for up to 5 days. The surgical method described by Dua and Azuara-Blanco¹ positions the limbal allograft posterior to the anatomical limbus in the host. The 150 µm thick donor limbal graft can result in a stepped ocular surface, which can be detrimental to long term survival of the transplanted epithelium. Splitting the ring of limbal tissue and interposing a separate piece of corneal stroma or limbus theoretically allows chinks in the reconstituted limbal barrier. Finally, the technique described does not allow sufficient flexibility in titrating the thickness of the donor tissue used. Since an important goal of ocular surface reconstruction is to achieve a smooth surface, surgeons often have to use donor limbal grafts of differing thickness in individual recipient eyes. This flexibility is possible if the limbal graft is fashioned from a C-S rim. In eyes undergoing combined penetrating keratoplasty and limbal transplantation, apposing the donor limbal and corneal graft without an intervening gap is preferable.

The surgical failure in case 4, who underwent limbal allotransplantation 3 weeks after severe alkali burns, corroborates our

recent report on the optimal timing of limbal transplantation after ocular surface burns.³ We feel that complex procedures such as limbal autografting or allografting are best performed after resolution of ocular surface inflammation and limbal revascularisation. While use of autoserum tears is beneficial, ostensibly by providing biological factors promoting epithelial health, corneal immunoglobulin deposition has been reported in a patient with persistent epithelial defect.⁴

Four of the eyes in this report have a follow up of less than 1 year. Both eyes with follow up greater than 1 year experienced a graft rejection episode—during FK-506 therapy in one eye and after cessation of the drug in the other. This emphasises our limited understanding of the immunology of this procedure. Despite the initial encouraging report by Tan *et al*,³ our experience in a larger cohort with longer follow up, indicates that HLA matched limbal transplants from live related donors have poor long term survival, in the absence of systemic immunosuppression.⁶ We thus, agree with Dua and Azuara-Blanco¹ that cadaver limbal transplantation offers the advantages of greater limbal stem cell transfer and is probably the procedure of choice despite the need for systemic immunosuppression of the recipient. A controlled clinical trial is difficult in this condition and reports like that of Dua and Azuara-Blanco are required to improve our understanding. We congratulate them on their use of FK-506 in limbal allografting.

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Reply

EDITOR,—Rao *et al* have raised several issues with regard to limbal stem cell transplantation. The use of fresh versus preserved donor tissue remains unresolved. Empirically it is generally considered that fresh limbal tissue is better than stored. Storage conditions vary in different countries. In the UK for instance, by far the largest supply of donor material is stored in organ culture medium (Eagle's MEM) with dextran added to deturgesce the tissue before use. This material has proved to be excellent for corneal transplantation (up to 4 weeks in storage) but has not been used for allo-limbal transplantation. Although corneal epithelial cell cultures can be established from

such donor rims, its efficacy as a source of limbal stem cells remains to be tested.

The thickness of 150 μ m includes 50 μ m or more of limbal epithelium. The thickness of stromal tissue is therefore less than 100 μ m. This is largely to facilitate handling and suturing of tissue. In our experience, the development of a “stepped ocular surface” was not an issue. In fact, over a period of several months, the tissue thinned and merged imperceptibly with the host. The “long term survival” of the epithelium was never compromised by the thickness of the donor limbus. The titration of donor tissue thickness is only relevant if a recipient bed is being fashioned to receive the donor tissue. This is often the case in auto-limbal transplantation.¹ Placement of the donor limbus posterior to the “perceived” anatomical limbus of the host (often it is not possible to absolutely certain where the original limbus of the host is), has the advantage of allowing use of a wider limbal rim, to include limbus and peripheral cornea. “Transient cells” have been shown to be present in the peripheral cornea.^{2,3} Posterior placement also makes it technically easier to perform a corneal graft should one be required at the time.

The risk of introducing “chinks in the limbal barrier”, allowing ingress of conjunctival epithelium, is only theoretical as the authors themselves have stated. The use of a “spacer” or an extra bit of limbus from the other donor eye has proved to be quite successful. Even if a complete donor limbal ring is used, it is important to watch the healing conjunctival epithelium from the recessed conjunctiva. At times, although the ring may be complete, the overlying epithelium may be missing in sectors. Conjunctival epithelium can cross over such a defect and encroach on to corneal surface. In such a situation, the principles laid down by Dua⁴ should be employed in the management.

We agree with the authors that the chances of failure are high when allo-limbal transplantation is undertaken during the acute stages of a chemical insult. This is particularly relevant when living related donor tissue is available. Such material must be reserved for use until after the acute inflammatory process has subsided. If limbal transplantation is considered essential in the early stages, serious consideration must be given to use of cadaveric donor tissue only.

Our experience with tacrolimus (FK-506, Prograf, Fujisawa Ltd, London) has been very good thus far. Several of our patients have been followed for over a year now. Attempts to reduce FK-506 (with a view to stopping treatment) have resulted in rejection reactions in two patients (one more since publication of the paper), but resolved on increasing the dose. In one patient where a rejection reaction was observed 4 months after transplantation, it corresponded to a very low trough level of the drug. We have also used this drug in the treatment of uveitis⁵ and several “high risk” corneal transplants with excellent results (unpublished observations). There is no doubt, like the authors have mentioned, that the therapy has to be continued long term.

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Amniotic membrane transplantation in ophthalmology (fresh v preserved tissue)

EDITOR,—Research on amniotic membrane transplantation in conjunctival and corneal disorders has been gaining popularity for the past 5 years.^{1,2} Though the concept is as old as six decades it has remained dormant over the years owing to unmentioned/unidentified factors.³ In 1996, we performed our first amniotic membrane transplant following surgery for recurrent pterygium with successful results. The procedure was similar to that of Tseng *et al* in 1998.¹ We followed the method of preparation of the graft as mentioned by Sorsby *et al* in 1947.³ We are strictly following the conventional method of tissue harvesting and preservation for clinical use.^{4,5}

However, we conducted a small study in six monkeys by using fresh amniotic membrane in six eyes, and in the six contralateral eyes preserved (–80°C) amniotic membrane (control) was used. Tissue harvesting was from elective caesarean section delivery. Processing of the tissue was by the conventional procedure followed worldwide in both the groups. An intentional 7 × 7 × 0.2 mm anterior keratectomy was made in all eyes. In one eye freshly obtained amniotic membrane was transplanted, while in the fellow eye –80°C preserved tissue was transplanted after opening the first eye. The eyelids were closed for 2 weeks. All the animals received intramuscular antibiotics for 1 week and intramuscular corticosteroids 1 g/kg/body weight for 2 weeks. The eyes were opened after 2 weeks. All the defects were healed and the corneas looked normal. From our small study it was evident that there was no difference in healing irrespective of method of preservation. However, to date no report has appeared on utilisation of freshly prepared amniotic membrane tissue transplantation. Though we routinely transplant amniotic membrane using the conventional method of preserved tissue, I would like to know the experience of other corneal surgeons who perform the procedure frequently, about the possibility of using fresh tissue clinically. I strongly feel that the procedure of amniotic membrane transplantation in a very safe, simple, and satisfactory method for treating conjunctival and corneal disorders; it can be practised by all corneal surgeons, even those who do not have access to –80°C facility.

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Reply

EDITOR.—Dr Panda's letter essentially asks the question whether fresh amniotic membrane would be as good as preserved (-80°C) amniotic membrane. An amniotic membrane may act as a biological bandage, as a basement membrane (substrate) transplant, or via several favourable growth factors and cytokines that promote healing and epithelial cell migration. If the last of these mechanisms of action of the membrane is important, then theoretically, fresh membrane should work better than preserved membrane. There is, however, no hard evidence to support this view yet. The experiment on monkeys, quoted in the letter by Dr Panda, suffers from the drawback, as do several published papers on use of amniotic membrane, of having no controls. It is very possible that the experimental epithelial defects created in healthy corneas of monkeys would have healed just as well without the use of either fresh or preserved membrane. Closing the eyelids for 2 weeks would itself have a very favourable influence on corneal epithelial wound healing.

The issue, whether fresh is as good as (or better than) preserved, is somewhat sidelined by the concern over the risk of HIV infection. One of the main reasons for using preserved tissue is to enable one to perform a test for HIV infection, on the donor mother, at the time of harvesting the membrane and 6 months later, to cover the window period. As one harvested membrane can be used for several recipients, there is a risk of widespread infection in case of contamination. For this and other issues related to amniotic membrane transplantation, we would like to draw attention to the review by Dua and Azuara-Blanco.¹

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Ocular abnormalities in a cohort of children born prematurely: effects of selection bias and possible confounding

EDITOR.—Studying children born prematurely Pennefather and colleagues¹ showed that the prevalence of several ocular abnormalities at the follow up examination at 2 years differed significantly between children who belonged

to families who attended follow ups as a routine (group 1) and those who were classified as very reluctant for assessment (group 3). These differences were of relatively high magnitude, with relative risks (actually odds ratios) varying from 5.54 for strabismus to 10.91 for cicatricial retinopathy of prematurity. The authors claim that they used multiple logistic regression in their statistical analysis, but if the figures shown in their study are adjusted odds ratios they are, according to my calculations, identical to the crude odds ratios, which means that there were no confounders to any of the studied associations. This apparently contradicts the findings of the study of Campbell and colleagues,² quoted by the authors, that level of prematurity of the children and age and marriage status of the mothers were correlated with non-attendance. If these variables are also associated with the ocular abnormalities of Pennefather *et al*'s study, and not intermediate variables between the exposures and outcomes of interest, they are confounders, and should have been adjusted for in the multivariate analysis.³ This point needs clarification.

Very interesting was the finding that the overall prevalence of abnormalities was similar between the total cohort (13.4%) and group 1 (11.3%). This small difference is explained because the proportion of losses to follow up that would have occurred under routine conditions was relatively small (9.5%), and did not have an important impact. It is an empirical demonstration that in cohort studies, for obtaining valid relative risk estimates it is very important to keep losses to follow up to a minimum, thereby minimising the role of selection bias.⁴

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Retinal nerve fibre layer thickness

EDITOR.—I read with interest the article by Assi *et al* on the measurement of the papillomacular retinal nerve fibre layer thickness in long standing stage IV macular holes.¹ Using the nerve fibre analyser the authors found no difference in papillomacular retinal nerve fibre layer thickness variables between healthy eyes and eyes suffering from stage IV macular holes. In their discussion the authors interpret their results as a tendency for higher readings in the macular hole group, and try to explain this unexpected finding with the potential effects of intraretinal fluid movement from the edge of the hole towards the optic disc or with mechanical deformation of the Henle's fibre layer by vitreous traction.

The authors' data, however, do not show a tendency for thickness being higher in the macular hole group. The differences between the groups are so minimal that they clearly do

not represent any clinically meaningful differences (as clearly shown by the statistical analysis). Though the mean values of the total and temporal retinal nerve fibre layer thickness in the diseased group are minimally higher than those of the healthy eyes, the corresponding standard deviations are also considerably higher than in the normal group. This point suggests that the macular hole group was more heterogeneous than the control individuals. Since, unfortunately, the age of the control subjects is not shown in the article, one may speculate that the "tendency for difference" or better to say the relative inhomogeneity of the thickness values among the eyes with macular holes is a consequence of a age difference between the groups or a wider age range among the patients than in the control group. This possibility seems to provide a very simple explanation for the authors' finding, since retinal nerve fibre layer thickness was shown to decrease with age.^{2,3} It would have been useful if the age of the control subjects had been provided by the authors, since excluding age related differences would support the fact that the inhomogeneity of the thickness values (and not a tendency for being higher than in the controls) is disease related, which seems to be realistic.

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Reply

EDITOR.—We thank Dr Hollo for his interest and comments. Our results do show a higher value for the mean total thickness of the retinal nerve fibre layer (RNFL) in the macular hole group but we did not suggest in any way a statistical or clinically significant difference between the two groups. We attempted to explain the apparently thicker peripapillary nerve fibre layer in macular holes on the basis of previous and relevant observations made by different authors. These include the presence of intraretinal fluid around the hole¹ and vitreous traction on Henle's fibre layer.² On the other hand, we have stated very clearly that our controls were matched to the macular hole patients for age, sex, and side of the affected eye. The mean age (73.1 years) and the standard deviation (7.92) are exactly the same for both groups. Dr Hollo's suggestion that the macular hole group is more heterogeneous on the basis of a different standard deviation value is therefore not valid. Although the number of subjects in our study is small, our data seem to suggest that the higher standard deviation value in the macular hole group might be related to alterations associated with long standing macular holes.

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BOOK REVIEWS

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Atlas of Eyelid and Conjunctival Tumors.

By Jerry A Shields, Carol L Shields. Pp 350. £101. Philadelphia: Lippincott Williams and Wilkins, 1999. ISBN 0-7817-1915-1

This hardback full colour photographic atlas is the first of a three volume series of atlases from the renowned ocular oncology service at Wills Eye Hospital, Philadelphia. The format is appealing with a left hand page of succinct text on each condition with choice references. The facing page is a plate of colour photographs, including clinical photographs, intra-operative photographs, radiographs and photographs of gross pathological specimens, and photomicrographs. Full colour drawings, 18 in total, of surgical techniques are also presented.

This atlas is comprehensive in its coverage with 95 different disease entities of the eyelids and conjunctiva described and illustrated. These include common and important diseases such as malignant melanoma and basal cell carcinoma as well as less common entities such as phacomatous choristoma. The contents are organised into 25 chapters, the first 15 (Part I) dealing with lesions of the eyelids with the remaining 10 (Part II) covering the conjunctiva. Within each part, tumours are logically grouped according to patterns of differentiation/presumed histogenesis. Therefore, for the eyelids, separate chapters exist—for example, for tumours of the epidermis, sebaceous glands, sweat glands, melanocytes, neural tissues, vascular tissues, etc. A strength is the inclusion of chapters covering inflammatory, infectious, developmental and other lesions, such as amyloidosis, that can simulate neoplasia. Interestingly, the authors have chosen to collect benign cystic lesions of the eyelids into a separate chapter rather than, for example, covering eccrine hidrocystoma in the chapter on sweat gland tumours. The final

chapter of each section discusses the surgical management of lesions at those sites.

This volume is remarkably authoritative, lavishly illustrated (1056 figures), and commendably succinct, in keeping with the aim of an atlas rather than a textbook. Valuable clinicopathological correlation is found for almost all lesions illustrated. Although this book is produced in the USA, its terminology and applicability are suitably international. Only a few examples of potentially troublesome nomenclatures are present, including the use of the term "benign lymphoma" and the classification of epithelial papillomas of the lacrimal drainage apparatus as "squamous" without reference to "transitional".

In summary, this is a superb atlas reflecting the outstanding experience and expertise of its authors. Its format and content ensure that it is equally at home as a reference text in the clinic setting, the library, the ophthalmic pathology laboratory or within a personal collection. It will be of value to general ophthalmologists and dermatologists, as well as specialists in external diseases, oculoplastics, oncology, or pathology. Reviewing this volume has made me determined to obtain the companion volumes on intraocular tumours and orbital tumours.

BRIAN J CLARK

Corneal Topography, Principles and Applications. By Melanie C Corbet, Emmanuel S Rosen, David P S O'Bart. Pp 230. £80. London: BMJ Books, 1999. ISBN 0-7279-1226-7

This is a well presented and easily assimilated book. It has high quality colour reproduction and the examples of the various videokeratographic maps are very clear if at times larger than they need be solely for the sake of clarity.

The book follows a logical progress from basic principles through the normal cornea and contact lens practice to the corneal appearance in disease and after corneal surgery. Each chapter is extensively, even zealously, referenced and I suspect that this is more than the average reader wants.

For the general reader or for someone who wants to get an overview of topography and topographical systems this book is probably as useful as any other than I have seen. It is readable and many will like the highlights in text boxes and tables. This is good communication.

There are, however, frustrating omissions. It is decidedly uncritical. I looked in vain for a realistic discussion on the imperfections and difficulties encountered in videokeratography—for example, the smoothing that takes place over the central cornea. There is no discussion about the manufacturers' algorithms—admittedly the manufacturers are secretive on this point but most readers would I think be interested in understanding better how the pretty isodiotric maps are produced. It would have been helpful, too, if some of the information that is not routinely given by the manufacturers, but is available, could have been discussed. For instance how can the user extract data from his device to permit statistical analysis?

The authors also fail like many before them to justify the need for expensive topographical devices. Reading the text it is difficult to get away from the impression that computer assisted topography is nothing more than pretty pictures and phenomenology. I would

like to have seen the chapter on contact lenses expanded.

The book is like a meal entirely consisting of canapés, very enjoyable but leaving one unsatisfied and wanting more.

COLIN M KIRKNESS

The Eye in Contact Lens Wear. 2nd ed. Ed J R Larke. Pp 202. £27.50. Oxford: Butterworth-Heinemann, 1997 (paperback edition 1999). ISBN 0-7506-4438-9

This paperback edition of a book, first produced in 1985 and revised for reissue in 1997, is aimed at the contact lens practitioner seeking information regarding the effect of contact lenses on the eye. It not only offers chapters covering the anatomy of the eyelids, conjunctiva, tear film, anterior limbus, and cornea, but it also reviews various aspects of corneal and anterior segment physiology such as corneal swelling, epithelial behaviour, and sensation and the way these are affected by contact lens wear. Chapters discussing lens spoilage, infection, and cornea are contributed by other experts in the field. While the text is a detailed discussion on the basic science, both qualitative and quantitative, it also shows their relevance to clinical aspects of contact lens wear to the practitioner. Some chapters are in more depth than others, but the style is clear and accessible. The text is amply supported by illustrations, graphs, tables, and photographs. The discussion in each chapter is supported by scientific argument based on experimental evidence and the published literature. Some of the references quoted, however, are fairly historical and I was a little surprised that all of the references in some chapters were from before the mid-1980s. I think the reader will also find that some of the data regarding pharmacological treatments have advanced since the time of writing.

Nevertheless, the text maintains an authoritative and comprehensive discussion of the topics covered. In particular, the chapters regarding lens spoilage and contact lens related infection were very clear and concise reviews of the subjects. For those interested in basic sciences, there is detailed study of corneal physiology including an examination, with relevant equations, of the forces involved in maintaining corneal hydration. I felt, however, that the description of the contemporary understanding of glycosaminoglycans and collagen arrangement could have been expanded and illustrated further with diagrams. In the chapter regarding recovery from contact lens wear, there was also mention of the topography of the cornea without illustration or reference to modern topographical methodology which I am sure would have helped illustrate the points.

I was disappointed at standard of the proof reading; some of the pharmacological terms and lens types were misspelt, and some of the legends were difficult to interpret without the main text.

In all, this is an interesting book to read and use as a reference for basic understanding of the subject, but other readers must be mindful of modern trends in materials and clinical and investigational techniques not presented here. It does, however, review certain topics which are not easily available in other textbooks, but are of great value to the contact lens specialist.

J ANGUS SCOTT

Visual Fields. By Neil Choplin, Russel Edwards. Pp 255. £26.95. Thorofare, NJ: Slack, 1998. ISBN 1-55642-363-2

This book is largely aimed at visual field technicians with the intention of providing them with the knowledge and skill required to produce visual field examinations of good quality.

Although several techniques and machines are discussed, emphasis is mainly on the use of the Humphrey visual field analyser. The authors introduce the reader to a brief description of the anatomy of the visual system with illustrations of basic defects patterns, then proceed to explain, in great detail, how to organise a visual field clinic and also give clear guidelines on how to administer the test. The instructions are full and comprehensive, including data storage and retrieval, setting up the machine, selecting corrective lenses, patient information, and a 15 point checklist for technicians.

The next section deals with errors in visual field testing and how to avoid them. It covers maintenance of automated and Goldmann perimeters, stimulus selection, monitoring of false positive responses, and others.

The last section is an "Atlas of common visual fields defects" covering glaucoma, retinal and neurological disease.

As an instructional book on how to use the Humphrey visual field analyser, it should be welcomed by technicians with limited experience in automated perimetry. However, regrettably, the Swedish Interactive Thresholding Algorithm (SITA) is not mentioned.

FERNANDO VALENZUELA

NOTICES

External eye infections

The latest issue of *Community Eye Health* (no 30) discusses external infections of the eye. Included are papers on conjunctivitis, corneal ulcer, and transmission and control of infection. For further information please contact *Community Eye Health*, International Centre for Eye Health, Institute of Ophthalmology, 11-43 Bath Street, London EC1V 9EL. (Tel: (+44) 171 608 6909/6910/6923; fax: (+44) 171 250 3207; email: eyeresource@ucl.ac.uk) Annual subscription £25. Free to workers in developing countries.

Residents' Foreign Exchange Programme

Any resident interested in spending a period of up to one month in departments of ophthalmology in the Netherlands, Finland, Ireland, Germany, Denmark, France, Austria, or Portugal should apply to: Mr Robert Acheson, Secretary of the Foreign Exchange Committee, European Board of Ophthalmology, Institute of Ophthalmology, University College Dublin, 60 Eccles Street, Dublin 7, Ireland.

Jules François Prize

The 2000 Jules François Prize of \$100 000 for scientific research in ophthalmology will be awarded to a young scientist who has made an important contribution to ophthalmology. All topics in the field of fundamental and/or clinical research in ophthalmology will be considered. The application should be sent jointly with a curriculum vitae, the list of all publications, and three copies of the candidate's 10 most relevant publications to Jules François Foundation Secretary, Professor Dr M Hanssens, Dienst Oogheelkunde, de Pintelaan 185, B-9000 Gent, Belgium. Deadline for applications 31 December 1999.

Joachim Kuhlmann Fellowship for Ophthalmologists 2000

The Joachim Kuhlmann AIDS Foundation, Essen, Germany, is sponsoring two fellowships per year for ophthalmologists at a well known institute, who want to train in CMV retinitis and other HIV related ophthalmological diseases. The fellowships are valued at \$US5000 each. deadlines for applications are 31 January and 31 July. Detailed applications, including CV and publication list, should be sent to the Joachim Kuhlmann AIDS Foundation, Bismarckstrasse 55, 45128 Essen, Germany (tel: 0201 87910-87; fax: 0201 87910-99; email: jk-stiftung@t-online.de).

16th Congress of the International Society for Geographical and Epidemiological Ophthalmology (ISGEO)

The 16th Congress of the ISGEO will be held at the Institut D'Ophthalmologie Tropicale De L'Afrique (IOTA) in Bamako, Mali on 21-22 February 2000. Further details: Dr Paul Courtright, ISGEO Secretary, BC Centre for Epidemiologic & International Ophthalmology, University of British Columbia, St Paul's Hospital, 1081 Burrard Street, Vancouver, BC V6Z 1Y6, Canada (email: pcourtright@stpaulshosp.bc.ca; website: www.interchange.ubc.ca/bceio/isgeo).

American Institute of Ultrasound in Medicine

The American Institute of Ultrasound in Medicine will hold the 44th annual convention in San Francisco, California on 2-5 April 2000. Further details: AIUM Professional Development Department, 14750 Sweitzer Lane, Suite 100, Laurel, MD 20707-5906 (tel: 800-638-5353; fax: 301-498-4100; email: conv_edu@aium.org; website: www.aium.org).

XXII Tuebingen Detachment Course

The XXII Tuebingen Detachment Course, retinal and vitreous surgery, will be held in the congress centre Incheba, Bratislava, Slovak Republic 6-7 April 2000 preceding the congress on retinal detachment of the Slovak Ophthalmological Society 8-9 April 2000. Further details: Professor Peter Strmen 81369 Bratislava, Miczkiewiczova 13 (tel/fax: 00421-7-52964641; email: strmen@faneba.sk).

Vith Mediterranean Ophthalmological Society

The combined meeting of the Vith Mediterranean Ophthalmological Society and the Vith Michaelson Symposium on Ocular Circulation and Neovascularisation will be held in Jerusalem on 21-26 May 2000. Further details: Secretariat, c/o Unitours Israel Ltd, PO Box 3190, 61031 Tel Aviv, Israel (tel: +972-3-5209999; fax: +972-3-5239099; email: meetings@unitours.co.il).

The Vith Michaelson medal and award will be delivered on 24 May 2000 in Jerusalem. The medal and award (\$15 000 monetary prize) are sponsored by the Israel Academy of Sciences and Humanities and by the Hadassah Hebrew University Hospital and Medical School of Jerusalem, Israel. Nominations are sought from the ophthalmic community at large. Suggestions and reasons for choice and CV highlights should be sent to Professor David BenEzra, Secretary for the International Nominating Committee, Pediatric Ophthalmology Unit, Hadassah Hebrew University Hospital, PO Box 12000, Jerusalem 91120, Israel.

5th International Vitreoretinal Meeting-IIV 2000

The 5th International Vitreoretinal Meeting-IIV 2000 will be held in Parma, Italy, on 26-27 May 2000. The main topics will include "Hypotony and glaucoma in vitreoretinal surgery", "Internal limiting membrane surgery", "Macula oedema", "Open globe injuries", and "News in retinal pigment epithelium". Further details: C Cantu, MA De Giovanni, or S Tedesco, Scientific Secretariat, Institute of Ophthalmology, University of Parma, Via Gramsci 14, 43100 Parma, Italy (tel: ++39 0521 259106; fax: ++39 0521 292358; email: nuzzi@ipr.univ.cce.unipr.it).

XXXIV Nordic Congress of Ophthalmology

The XXXIV Nordic Congress of Ophthalmology will be held in Reykjavik, Iceland, 18-21 June 2000. This meeting celebrates the 100 year anniversary of the Nordic Ophthalmology Conference. Further details: Iceland Incentives Inc, Hamraborg 1-3, Is-Kopavogur, Iceland (tel: +354 554 1400; fax: +354 554 1472; email: incentiv@itn.is).

13th Annual Meeting of German Ophthalmic Surgeons

The 13th annual meeting of German Ophthalmic Surgeons will be held on 15-18 June 2000 at the Meistersingerhalle, Nuremberg, Germany. Further details: MCN Medizinische Congress-organisation Nuremberg AG, Zerzabelshofstrasse 29, D-90478 Nuremberg, Germany (tel: +49-911-3931621; fax +49-911-3931620; email: doerffinger@mcn-nuermberg.de).

DR-2000, International Forum on Diabetic Retinopathy

The International Forum on Diabetic Retinopathy will take place on 7-9 September 2000 at the Palazzo Reale, Naples, Italy. Further details: Francesco Bandello, Congress Secretariat, MGR Congressi, Via Servio Tullio, 4,

20123 Milano, Italy (tel: 39 02 430071; fax: 39 02 48008471; email: dr2000@mgr.it).

510060, PR China (tel: +86-20-8760 2402; fax: +86-20-8777 3370; email: lwuicv@gzsums.edu.cn).

pore 168751 (tel: (65) 2277255; fax: (65) 2277290; internet: www.snec.com.sg).

12th Afro-Asian Congress of Ophthalmology

The 12th Afro-Asian Congress of Ophthalmology (Official Congress for the Afro-Asian Council of Ophthalmology) will be held on 11–15 November 2000 in Guangzhou (Canton), China. The theme is “Advances of ophthalmology and the 21st century”. Further details: Professor Lezheng Wu, Zhongshan Eye Center, SUMS, New Building, Room 919, 54 Xianlie Nan Road, Guangzhou

Singapore National Eye Centre 10th Anniversary International Congress

The Singapore National Eye Centre 10th Anniversary International Congress will be held in conjunction with 3rd World Eye Surgeons Society International Meeting on 2–4 December 2000 at the Shangri-La Hotel, Singapore. Further details: The Organising Secretariat, 11 Third Hospital Avenue, Singa-

The Hong Kong Ophthalmological Symposium 99

The Hong Kong Ophthalmological Symposium 99 will be held 4–5 December 2000, in Hong Kong, China. Further information: Miss Vicki Wong, Room 802, 8/F Hong Kong Academy of Medicine, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong (tel: (852) 2761 9128; fax: (852) 2715 0089; email: cohk@netvigator.com).



Allo-limbal transplantation in patients with limbal stem cell deficiency

ALVIN L YOUNG, ALFRED T S LEUNG and DENNIS S C LAM

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