Correction of Presbyopia

This seventh article describing the series of short courses on cataract and refractive surgery at the University of Ulster focuses on the execution and management of laser surgery.

BY SUNIL SHAH, FRCOPHTH, FRCS(ED), FBCLA; COLM MCALINDEN, BSC (HONS), MCOPTOM; ANTONIO LECCISOTTI, MD, PHD; JOHNNY E. MOORE, FRCOPHTH, PHD; DAMIEN MCCONVILLE, MSC, MBCS, FHEA; AND TARA MOORE, PHD

This series of articles follows students undertaking the nine-course University of Ulster's E-learning program. The first year of the course explores theory, followed by the second year of affiliated research projects. Subjects covered within the course include thermokeratoplasty, excimer laser surgery for presbyopia, clear lens extraction, microincision cataract surgery, and aspheric and multifocal IOLs.

WEEK 1

Professor Alió's lecture discussed thermokeratoplasty, which works on the principle that corneal collagen shrinks to 30% to 45% of its original length when heated to between 58° and 60° C. Energy spots applied to the midperipheral cornea produce a girdle-like effect, essentially increasing central curvature. The main application is the correction of hyperopia. The first thermokeratoplasty technique was designed in 1984 by S. Fyodorov (nichrome wire 600° C), and in 1987 Kanoda invented the Yt-Er-crystal laser for thermokeratoplasty. More recently, other lasers for thermokeratoplasty as well as conductive keratoplasty (CK) techniques were developed.

Discussions centered principally on the assessment of patients for monovision, including the counseling process. Participants were encouraged to consider what patients and professions are most suitable for monovision. The personality of the individual was deemed the most important factor. Additionally, the distance vision target in the dominant eye should be close to emmetropia (ie, within 0.50 D) for patients to be happy.

Problems associated with CK, such as regression and induced astigmatism, were also discussed. When induced astigmatism occurs, regression often results more quickly.

WEEK 2

Dr. Cummings introduced excimer laser techniques for presbyopia. Currently, the main options include monovision and multifocal corneal ablations. Multifocal ablations originated from the observation that hyperopic presbyopes often have better near vision than expected. This led to debate about how asphericity of the cornea may play a role in this patient population.

Dr. Cummings described various types of presby-LASIK and other laser options, such as bifocal LASIK. Discussions included the advantages and disadvantages of monovision compared with presby-LASIK. The ease of simulating monovision versus other forms of multifocality was considered a positive factor for monovision. Multifocality is always difficult to reverse, whether produced by a corneal or IOL procedure. It was the general consensus that multifocal presbyopic laser treatments appear to contradict all present teaching to keep contrast high and reduce, rather than induce, corneal aberrations. It must always be kept in mind that future cataract surgery would be required.

WEEK 3

Professor Alió outlined the dysfunctional changes of aging within the human lens, paying close attention to the value of microincision cataract surgery (MICS), such as its reduced effect on corneal astigmatism and aberrations.

Professor Leccisotti introduced various types of multifocal and aspheric IOLs and outlined the natural types of aberrations present within the human eye. He also discussed how refractive corneal laser changes these aberrations. Professor Leccisotti recommended aspheric or spherical monofocal IOLs for eyes with previous laser refractive surgery. Finally, his lecture outlined different types of multifocal IOLs and the indications for their use along with potential complications.

Discussions commenced by comparing accommodating and multifocal IOLs. Potentially, night drivers may have problems with multifocal IOLs, which would be avoided through the use of an accommodating IOL. The innate problem of accommodating IOLs, however, is predictability of near vision, especially if patients strongly desire spectacle independence.

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Several surgeons felt that their previous experiences with multifocal IOLs with regard to explantation had pushed them toward the use of accommodating rather than multifocal IOLs. Absolute care is required preoperatively to pick suitable candidates to limit the likelihood of postoperative problems. ■

Antonio Leccisotti, MD, PhD, is a Visiting Professor at the School of Biomedical Sciences, University of Ulster, Coleraine, Northern Ireland, and Director of the Ophthalmic Department, Casa di Cura Rugani, Siena, Italy. Dr. Leccisotti states that he has no financial interest in the products or companies mentioned. He may be reached at tel: +39 335 8118324; fax: +39 0577 578600; e-mail: leccisotti@libero.it.

Colm McAlinden, BSc (Hons), MCOptom, is an optometrist currently undertaking a PhD in refractive surgery with the School of Biomedical Sciences, University of Ulster, Coleraine, Northern Ireland. Mr. McAlinden states that he has no financial interest in the products or companies mentioned. Mr. McAlinden may be reached at e-mail: colm.mcalinden@gmail.com.

Damien McConville, MSc, MBCS, FHEA, is a Learning Technologist at the Institute of Lifelong Learning, University of Ulster. Dr. McConville states that he has no financial interest in the products or companies mentioned. He may be reached at tel: +44 0 2890368537l; e-mail: d.mcconville@ulster.ac.uk.

Johnny E. Moore, FRCOphth, PhD, is a Visiting Professor at the School of Biomedical Sciences, University of Ulster, Coleraine, Northern Ireland, and Department of Ophthalmology, Mater Hospital, Belfast Hospital Trust Northern Ireland, and Director of Leeson Eye Institute, Dublin, Ireland. Dr. Moore states that he has no financial interest in the products or companies mentioned. He may be reached at tel: +353 0 16674778; e-mail: johnnymoorebal@gmail.com.

Tara Moore, PhD, NTF, is a Course Director and Senior Lecturer at the School of Biomedical Sciences, University of Ulster, Coleraine, Northern Ireland. Dr. Moore states that she has no financial interest in the products or companies mentioned. She may be contacted at tel: +44 0 7793226873; e-mail: t.moore@ulster.ac.uk.

Sunil Shah, FRCOphth, FRCSEd, FBCLA, is a Visiting Professor at the School of Biomedical Sciences, University of Ulster, Coleraine, UK, Visiting Professor at the School of Life & Health Sciences, Aston University, Birmingham, UK, Medical Director, Midland Eye Institute, Solihull, UK, Consultant Ophthalmic Surgeon, Heart of England Foundation Trust, Birmingham, UK, and Consultant Ophthalmic Surgeon, Birmingham & Midland Eye Centre, Birmingham, UK. Dr. Shah states that he has no financial interest in the products or companies mentioned. He may be reached at tel: +441217112020; fax: +441217114040; e-mail: sunilshah@doctors.net.uk.