SUMMARY OF SAFETY AND EFFECTIVENESS DATA (SSED)

I. GENERAL INFORMATION

Device Generic Name: Multifocal Posterior Chamber Intraocular Lens (IOL)

Device Trade Name: Tecnis® Multifocal Posterior Chamber Intraocular Lens, Models ZM900 (silicone) and ZMA00 (acrylic)

Applicant's Name and Address:

Advanced Medical Optics, Inc.
1700 E. St. Andrew Place
Santa Ana, CA 92705

Date(s) of Panel Recommendation: Not applicable

Premarket Approval (PMA) Application Number: P080010

Date of FDA Notice of Approval: January 16, 2009.

Expedited: Not applicable

II. INDICATIONS FOR USE

Tecnis® multifocal intraocular lens is indicated for primary implantation for the visual correction of aphakia in adult patients with and without presbyopia in whom a cataractous lens has been removed by phacoemulsification and who desire near, intermediate, and distance vision with increased spectacle independence. The intraocular lenses are intended to be placed in the capsular bag.

III. CONTRAINDICATIONS

No absolute contraindications known.

IV. WARNINGS AND PRECAUTIONS

The warnings and precautions can be found in the Tecnis® Multifocal IOL labeling.

V. DEVICE DESCRIPTION

The Tecnis® multifocal intraocular lens is an ultraviolet light-absorbing posterior chamber intraocular lens. It is designed to be positioned posterior to the iris whereby the lens

should replace the optical function of the natural crystalline lens. The lens is designed to provide both near and far vision and thereby reduce spectacle dependency. The light distribution between the distance (far) and near focus is approximately 50/50. The labeled power of the lens is the distance power. The near power represents a +4 diopter add in actual lens power (approximately +3 D in the spectacle plane).

The Tecnis® multifocal lens has a diffractive multifocal surface on the posterior side of the lens and the Tecnis® modified prolate (aspheric) surface on the anterior side. The Tecnis® multifocal lens is available in two material platforms: Model ZM900 has a silicone optic and Model ZMA00 has a soft hydrophobic acrylic optic. Both lens models are three-piece foldable posterior chamber lenses.

The silicone Tecnis® multifocal lens Model ZM900 has an optic made of high refractive index ultraviolet light-absorbing silicone (polysiloxane) and haptics made of polyvinylidene fluoride (PVDF). The optic is 6.0 mm in diameter and the lens has an overall diameter of 12.0 mm. Model ZM900 is available in a diopter range of +5.0 D to +34.0 D in 0.5 D increments.

The acrylic Tecnis® multifocal lens Model ZMA00 is a minor (material) modification of the model ZM900 and has an optic made of soft hydrophobic acrylic and haptics made of polymethylmethacrylate (PMMA). The optic is 6.0 mm in diameter and the lens has an overall diameter of 13.0 mm. Model ZMA00 is available in a diopter range of ± 5.0 D to ± 34.0 D in 0.5 D increments.

VI. ALTERNATIVE PRACTICES OR PROCEDURES FOR CATARACTS

The cataract extraction must be followed by some form of optical correction such as eye glasses (spectacles), contact lenses, or intraocular lenses.

Cataract spectacles are an effective means of correction of this condition, but may result in some visual distortion because of the high plus power of the lens. The image of the object being viewed is highly magnified (15 to 20%) and confined to the center of the field, so that peripheral vision is highly restricted. In addition, a monocular cataract lens induces such retinal image size disparity between the phakic and aphakic eyes that this method is essentially inappropriate for the monocular aphake.

Contact lenses are another available method. However, they may have reduced image magnification and improved visual field compared to cataract spectacles, but they may not be tolerated by all patients. In particular, elderly patients frequently are reluctant or unable to manipulate contact lenses or to undertake the cleaning and disinfection processes.

Intraocular lenses (IOLs) reduce the magnification of the image to a subjectively unappreciable level and eliminate the need for maintenance of contact lenses. They are undetectable to the wearer and provide a permanent means of correction. Monofocal IOLs have been the most common type of IOL used to date. Monofocal IOLs provide excellent vision at one set distance, typically far. This means that the patient has good distance vision but in all likelihood requires eye glasses to see objects up close. Multifocal IOLs have more than one focal point, allowing patients to potentially have good distance vision and good near vision, thereby reducing their dependence on eye glasses to see objects up close.

VII. MARKETING HISTORY

The Tecnis® Multifocal IOLs has been distributed outside the United States in more than 50 countries where regulatory approvals have been obtained (including Japan, China, Korea, Taiwan, the European Union, and Canada) as well as non-regulated countries. As of March 2008, approximately 60,000 Tecnis Multifocal IOLs have been sold outside the United States. There have been no recalls or withdrawals of these lenses.

VIII. POTENTIAL ADVERSE EFFECTS OF THE DEVICE ON HEALTH

Potential adverse events and complications accompanying cataract or implant surgery may include, but are not limited to the following: corneal endothelial damage, infection (endophthalmitis), retinal detachment, vitritis, cystoid macular edema, corneal edema, pupillary block, cyclitic membrane, iris prolapse, hypopyon, transient or persistent glaucoma, acute corneal decompensation, and secondary surgical intervention.

Secondary surgical interventions include, but are not limited to, lens repositioning (due to decentration, subluxation, or corneal touch), lens exchange (due to optical symptoms such as glare and haloes or residual refractive error), vitreous aspirations or iridectomy for pupillary block, wound leak repair, retinal detachment repair, and corneal transplantation. Silicone oil, particularly when used in the surgical treatment of detached

retina, may stick to the silicone IOL if the posterior capsule of the crystalline lens is not intact.

For the specific adverse events that occurred in the clinical studies, please see Section X below.

IX. SUMMARY OF PRECLINICAL STUDIES

Preclinical studies are summarized below:

A. Biocompatibility Studies

AMO conducted a battery of *in vivo* and *in vitro* acute and chronic toxicity tests that establish the biocompatibility for lens materials. The biocompatibility studies were performed in accordance with the requirements in ISO 11979-5 to establish a complete profile of the IOL material. Summaries of the biocompatibility tests conducted are listed in Table 1.

The silicone Tecnis® multifocal intraocular lens is manufactured using the same materials previously qualified with other FDA-approved silicone IOL designs. The optic is made of high refractive index (HRI) silicone and the haptics are made of polyvinylidene fluoride (PVDF). The biocompatibility tests for the optic and haptic are summarized in Table 1. All testings were conducted in accordance with Good Laboratory Practices (GLP).

Table 1: Biocompatibility Testing for Model ZM900

Test	Results
Cytotoxicity, Elution Method	No significant evidence of cell lysis or toxicity
Cytotoxicity, Agarose Overlay (Direct)	No evidence of cell lysis or toxicity in treated cells
Cytotoxicity, Agarose Overlay (Extract)	Non evidence of cell lysis or toxicity
Inhibition of Cell Growth, 9-Point Assay	No or minimal cell growth inhibition
Rabbit Blood Hemolysis Determination, Extract Method	Non-hemolytic
Ames Bacterial Reverse Mutation Assay (Ames Assay)	Non mutagenic
Genotoxicity, Unscheduled DNA Synthesis in Mammalian Cells	Non genotoxic
Acute Systemic Toxicity	Non-toxic
Intramuscular Implantation, 7-Day and 30-Day	No abnormal clinical signs
Intracutaneous Toxicity	No erythema or edema observed
Guinea Pig Delayed Contact Sensitization (Maximization Method for Biomaterial Extracts)	No significant reaction; non sensitizing

Test	Results
Biocompatibility Study of a High Refractive Index Silicone Intraocular Lens with Clear PVDF Loops in a Rabbit Model, 12-Month Report	Passed
Exhaustive Extraction	Passed
Hydrolytic Stability	Passed
Photostability	Passed
Nd:YAG Laser Interaction	Passed

B. Laboratory Studies

Laboratory testing was performed for ZM900 model. Optical testing was performed according to ISO 11979-2 and ISO 11979-9. Mechanical testing was performed according to ISO 11979-3. Summaries of the optical and mechanical test results are presented in Table 2.

Table 2: Laboratory Studies for Model ZM900

Test	Results
	Model ZM900
Optical Testing	
Dioptric Power	Passed
Imaging Quality	Passed
Spectral Transmittance	Passed
Mechanical Testing	
Dimensions	Passed
Compression Force	Passed
Axial Displacement	Passed
Optic Decentration	Passed
Optic Tilt	Passed
Angle of Contact	Passed
Compression Force Decay	Passed
Dynamic Fatigue Durability	Passed
Loop Pull Strength	Passed
Recovery of Properties Following Simulated Surgical Manipulation	Passed
Surface and Bulk Homogeneity	Passed

C. Sterilization, Packaging, Shelf Life and Transport Stability

The Tecnis® multifocal intraocular lens, Model ZM900 is packaged in a polycarbonate lens case, sealed with a Tyvek lid, and placed in a Tvyek/mylar pouch. Pouched lenses are sterilized using an ethylene oxide sterilization method. Testing performed in association with the ethylene oxide (EO) sterilization process demonstrates that lenses meet the requirements for sterility assurance, bacterial endotoxin levels, and ethylene

oxide residual levels. Testing associated with the packaging, shelf life, and transport processes demonstrate that the packaging configuration maintains its sterile barrier and protects the lens during transport. These tests were conducted in accordance with the following standards and pharmacopoeial chapters:

- ISO 11135-1, Sterilization of Healthcare Products – Ethylene Oxide – Part 1: Requirements for Development, Validation, and Routine Control of a Sterilization Process
- ISO 10993-7, Biological evaluation of medical devices – Part 7: Ethylene oxide sterilization residuals
- USP 23, <71>, 1995, Bacteriostasis and fungistasis testing
- USP 23, <71>, 1995, Bacterial endotoxin testing
- ISO 11979-6, Ophthalmic Implants – Intraocular lenses – Part 6: Shelf-life and transport stability

Table 3 summarizes the sterilization, packaging, shelf life and transport stability results for Model ZM900.

Table 3: Sterilization, Packaging, Shelf Life and Transport Stability Testing for Model ZM900

Test	Results
	Model ZM900
Sterilization	
Sterility Testing	No microbial growth was detected
Bacterial Endotoxin	Endotoxin levels were below the agency's recommended limit for medical devices
Ethylene Oxide Residuals	Residual levels met ISO 10993-7 specification
Package Integrity	No channel leaks in packaging / Sterility samples showed no growth / Burst strength met minimum requirements
Shelf Life	Results were satisfactory to support three years shelf life
Transport Stability	The results showed lenses would not be damaged during shipping

X. SUMMARY OF PRIMARY CLINICAL STUDIES

A. Study Design

The objective of this clinical study was to assess the safety and effectiveness of the Tecnis® ZM900 multifocal IOL versus the CeeOn® 911A control monofocal IOL. The purpose of the expansion study, DIOL-104-CNS, is to further evaluate the clinical performance of the Tecnis® ZM900 multifocal lens.

Two clinical studies were conducted in the United States to evaluate the safety and effectiveness of the silicone Tecnis® multifocal IOL, Model ZM900. The initial study was an one-year, open-label, evaluator-masked, bilateral, parallel-group comparative study of the Tecnis® multifocal lens, Model ZM900 and the CeeOn® monofocal lens, Model 911A, conducted at 13 investigational sites in the USA. The second study was a single-arm expansion study initiated to collect additional data in the USA on a full complement of multifocal subjects. At the time of data analyses, the expansion study was ongoing at 16 investigational sites in the USA and was a one-year, open-label, unilateral or bilateral, clinical evaluation of the Tecnis® multifocal lens. Between the two studies, a total of 470 subjects were enrolled; 347 were implanted with the Tecnis® multifocal lens Model ZM900 (306 bilaterally implanted) and 123 with a monofocal control IOL (CeeOn® 911A; 122 bilaterally implanted). The 4-6 month results from both studies are presented; one-year results are presented from the initial study only as no subjects in the expansion study had reached the one-year visit at the time of data analyses.

1. Clinical Inclusion and Exclusion Criteria

In general, study eyes were to be healthy eyes with no pathology other than cataract and meeting the following criteria:

Subject Inclusion Criteria

- Age 18 or greater
- Cataract(s) for which phacoemulsification extraction and posterior IOL implantation has been planned for both eyes (DIOL-101-TCNS) or at least one eye (DIOL-104-TCNS)
- Visual potential of 20/30 or better in each study eye
- Preoperative BCDVA worse than Snellen 20/40 or worse than 20/30 in the presence of glare (as measured using a Snellen chart with BAT at medium)
- Naturally dilated pupil size (in dim light) > 4.0 mm (with no dilation medications) for each study eye
- Preoperative corneal astigmatism of 1.0 D or less

Subject Exclusion Criteria

- Use of systemic or ocular medications that may affect vision
- Acute or chronic disease or illness that would increase the operative risk or confound study outcome(s) (e.g., diabetes mellitus)
- Uncontrolled systemic or ocular disease
- History of ocular trauma or prior ocular surgery or subjects expected to require retinal laser treatment or other surgical intervention
- Presence of ocular pathology other than cataract such as:
    - Amblyopia or strabismus
    - Corneal abnormalities
    - Pupil abnormalities
    - Capsule or zonule abnormalities
    - Intraocular inflammation
    - Known pathology that may affect visual acuity and/or are predicted to cause future acuity losses to a level of 20/30 or worse (e.g., macular degeneration
- Requiring an intraocular lens outside the diopter range as follows:
    - DIOL-101-TCNS: <15.0 or >26.0 diopters
    - DIOL-104-TCNS: <12.0 or >28.0 diopters

Contact lens usage within a specified time interval (dependent upon contact lens type) prior to study procedure

2. Follow-up Schedule

The study visit schedule for bilateral subjects in both studies (DIOL-101-TCNS and DIOL-104-TCNS) was/is as follows:

Table 4 Bilateral Subjects

Visit	Eyes Evaluated	Exam	Visit Window
1	Both Eyes	Preoperative Exam	Within 30 days prior to 1st surgery
2	First Eye	Operative	1-30 days following preop (DIOL-101-TCNS) 0-30 days following preop (DIOL-104-TCNS)
3	First Eye	Postop 1 (1 day postoperative)	1-2 days
4	First Eye	Postop 2 (1-2 weeks postoperative)*	7-14 days
5	Second Eye	Operative	Within 1 month after 1st eye surgery
6	Second Eye	Postop 1 (1 day postop from 2nd implant)	1-2 days
7	Second Eye	Postop 2 (1-2 weeks postop from 2nd implant)	7-14 days
8	Both Eyes	Postop 3 (1-2 months postop from 2nd implant)	30-60 days
9	Both Eyes	Postop 4 (4-6 months postop from 2nd implant)	120-180 days
10	Both Eyes	Postop 5 (1 year postop from 2nd implant)	330-420 days

* Postop 2 for the first eye was to be completed prior to surgery on the second eye.

Subject Exclusion Criteria

- Use of systemic or ocular medications that may affect vision
- Acute or chronic disease or illness that would increase the operative risk or confound study outcome(s) (e.g., diabetes mellitus)
- Uncontrolled systemic or ocular disease
- History of ocular trauma or prior ocular surgery or subjects expected to require retinal laser treatment or other surgical intervention
- Presence of ocular pathology other than cataract such as:
    - Amblyopia or strabismus
    - Corneal abnormalities
    - Pupil abnormalities
    - Capsule or zonule abnormalities
    - Intraocular inflammation
    - Known pathology that may affect visual acuity and/or are predicted to cause future acuity losses to a level of 20/30 or worse (e.g., macular degeneration
- Requiring an intraocular lens outside the diopter range as follows:
    - DIOL-101-TCNS: <15.0 or >26.0 diopters
    - DIOL-104-TCNS: <12.0 or >28.0 diopters

Contact lens usage within a specified time interval (dependent upon contact lens type) prior to study procedure

2. Follow-up Schedule

The study visit schedule for bilateral subjects in both studies (DIOL-101-TCNS and DIOL-104-TCNS) was/is as follows:

Table 4 Bilateral Subjects

Visit	Eyes Evaluated	Exam	Visit Window
1	Both Eyes	Preoperative Exam	Within 30 days prior to 1st surgery
2	First Eye	Operative	1-30 days following preop (DIOL-101-TCNS) 0-30 days following preop (DIOL-104-TCNS)
3	First Eye	Postop 1 (1 day postoperative)	1-2 days
4	First Eye	Postop 2 (1-2 weeks postoperative)*	7-14 days
5	Second Eye	Operative	Within 1 month after 1st eye surgery
6	Second Eye	Postop 1 (1 day postop from 2nd implant)	1-2 days
7	Second Eye	Postop 2 (1-2 weeks postop from 2nd implant)	7-14 days
8	Both Eyes	Postop 3 (1-2 months postop from 2nd implant)	30-60 days
9	Both Eyes	Postop 4 (4-6 months postop from 2nd implant)	120-180 days
10	Both Eyes	Postop 5 (1 year postop from 2nd implant)	330-420 days

* Postop 2 for the first eye was to be completed prior to surgery on the second eye.

The study visit schedule for unilateral subjects in the DIOL-104-TCNS study is as follows:

Table 5 Unilateral Subjects

Visit	Exam	Visit Window
1	Preoperative Exam	Within 30 days prior to surgery
2	Operative	0-30 days following preoperative exam
3	Postop 1 (1 day postoperative)	1-2 days
4	Postop 2 (1-2 weeks postoperative)	7-14 days
5	Postop 3 (1-2 months postoperative)	30-60 days
6	Postop 4 (4-6 months postoperative)	120-180 days
7	Postop 5 (1 year postoperative)	330-420 days

In the DIOL-104-TCNS study, if a bilateral subject did not have his/her second-eye surgery performed within 60 days of the first-eye surgery, the subject was to follow the unilateral study schedule for each implanted eye separately. In the DIOL-101-TCNS study, all bilateral subjects followed the bilateral schedule regardless of time between surgeries.

3. Clinical Endpoints

The purpose of the initial clinical study was to evaluate the safety and effectiveness of the Tecnis® multifocal lens Model ZM900 compared to the CeeOn® monofocal lens Model 911A. The purpose of the expansion study was to further evaluate the clinical performance of the Tecnis® multifocal lens. The primary effectiveness endpoint was binocular distance corrected near visual acuity (ETDRS (Early Treatment Diabetic Retinopathy Study) 100% near chart) under photopic conditions at both a fixed distance and the subject's preferred distance. The primary safety endpoints were monocular and binocular best corrected distance visual acuity (ETDRS 100% distance chart) under photopic conditions as well as complication and adverse event rates. Other study parameters included uncorrected distance visual acuity, uncorrected near visual acuity, subject satisfaction/quality of life evaluations, reading ability, defocus curves, contrast sensitivity and nighttime driving simulation outcomes.

B. Accountability of PMA Cohort

Between the two studies, a total of 347 Tecnis® multifocal subjects (306 bilaterally implanted) and 123 CeeOn® monofocal subjects (122 bilaterally implanted) were enrolled. Compliance in both studies was excellent with 96.5% (335/347) of Tecnis®

multifocal subjects and 96.7% (119/123) of the monofocal control subjects completing the 4-6 month study visit; additionally, 95.2% (119/125) of the multifocal subjects and 94.3% (116/123) of the monofocal control subjects completed the one-year study visit. Between the two studies, only one subject in each lens group was lost-to-follow-up to date (0.8% per lens group at one year), below the accepted standard of 10% per year. Values for percent accountability calculated in accordance with the draft ANSI multifocal lens standard (Z80.12) are presented in Tables 6 and 7 for the 4-6 months and one-year postoperative visits, respectively.

Table 6: Percent Accountability at 4-6 Months

Percent Accountability = Available for Analysis / (Enrolled – Discontinued – Active)	ZM900 Tecnis Multifocal Subject Accountability	CeeOn 911A Monofocal Control Subject Accountability
	= 335/(347-8-2)	= 119/(123-3-0)
	= 335/337	= 119/120
	= 99.4%	= 99.2%

Table 7: Percent Accountability at One Year *

Percent Accountability = Available for Analysis / (Enrolled – Discontinued – Active)	ZM900 Tecnis Multifocal Subject Accountability	CeeOn 911A Monofocal Control Subject Accountability
	= 117†/(125-6-0)	= 116/(123-6-0)
	= 117/119	= 116/117
	= 98.3%	= 99.1%

* None of the subjects in the expansion study have completed the one-year visit to date.

† Of the 119 subjects who completed a final exam, two multifocal subjects were not available for analysis: one was not bilaterally implanted, although a one-year exam was completed for the first eye prior to exiting the study; a second subject completed the final exam following database closure. Therefore, percent accountability is based on a total of 117 bilateral subjects.

C. Study Population Demographics and Baseline Parameters

A total of 347 Tecnis® multifocal subjects and 123 CeeOn® monofocal subjects were enrolled between the two studies. The overall study population consisted of more females than males in both lens groups: 60.8% (211/347) female vs. 39.2% (136/347) male in the multifocal lens group; and, 65.9% (81/123) female vs. 34.1% (42/123) male in the monofocal control lens group. The mean age for multifocal subjects was 65.9 years (ranging from 29 to 87 years); the mean age for monofocal control subjects was 68.7 years (ranging from 35 to 84 years). The majority of subjects in both lens groups were Caucasian (95.7%, 332/347, of multifocal subjects and 92.7%, 114/123, of monofocal control subjects). The study also included other races: Black 2.0% (7/347) in the multifocal group and 5.7% (7/123) in the monofocal control group; Asian 0.9% (3/347) in the multifocal group and 1.6% (2/123) in the monofocal control group; and

"Other" 1.4% (5/347) in the multifocal group and none (0/123) in the monofocal control group.

The majority of all baseline parameters tested were similar between the multifocal and monofocal lens groups. A difference was found for corrected distance visual acuity with slightly more multifocal first eyes having better acuity; however, this difference was not observed when corrected distance visual acuity with glare was compared between groups. No monofocal subjects/eyes were targeted for monovision. Emmetropia was the refractive target for all eyes (with or without adjustment for surgeon factors and/or outcome of the first eye).

D. Safety and Effectiveness Results

The 4-6 month results from both studies are presented for 335 Tecnis® multifocal subjects (297 bilaterally implanted) and 119 bilaterally implanted monofocal subjects. One-year results are presented for 118 bilateral Tecnis® multifocal subjects and 116 bilateral monofocal subjects from the initial study, as no subjects in the expansion study had reached the one-year visit at the time of data analyses.

1. Safety Results

The incidence of cumulative complications and adverse events across both studies for Tecnis® multifocal first eyes compared to the US FDA historical grid rate are presented in Table 8. The incidence rates for the Tecnis® multifocal lens Model ZM900 compared favorably to the specified FDA grid rate. Only the rate of surgical re-interventions in the Tecnis® ZM900 lens group was statistically higher than the FDA grid rate of 0.8% ($p<0.0001$). As only three subjects (3/348; 0.9%) experienced lens-related events (two subjects experienced events related to glare/halos and one subject experienced events related to optical quality), lens-related surgical re-intervention rates for first and second eyes were not statistically higher than the re-intervention grid rate (first eyes, $p=0.4725$; second eyes, $p=0.4432$). The rate of non-lens-related surgical re-interventions in multifocal first eyes was statistically higher than the grid rate ($p=0.0022$). Surgical re-intervention events for multifocal first eyes are provided in Table 9.

Table 8
Cumulative Adverse Events for the Tecnis ZM900 Multifocal First Eyes

Cumulative Adverse Event	ZM900 N=348*		FDA Grid Rate
	n	%	%
Hyphema	0	0.0	2.2
Macular edema	8	2.3	3.0
Retinal detachment	0	0.0	0.3
Pupillary block	0	0.0	0.1
Lens dislocation	0	0.0	0.1
Endophthalmitis	1#	0.3	0.1
Hypopyon	1#	0.3	0.3
Surgical re-intervention	12	3.4	0.8
Lens related	2Ω	0.6	
Not lens related	10#	2.9	

* Excluded subject with lens exchange due to incorrect lens type included in study population for adverse events only: 348 first eyes instead of 347.

One eye experienced endophthalmitis and hypopyon followed by non-lens-related surgical re-interventions (trabeculectomy and two filtration bleb revisions).

Ω Following study completion, two subjects experienced lens-related events in the first eye; however, one of these had also experienced an event in the first eye during the study. Therefore, the total number of first eyes with lens-related events during and after the study is three (3/348; 0.9%) – the same three subjects with lens-related events in second eyes during the study.

Table 9
Surgical Re-Interventions in Tecnis ZM900 First Eyes

Surgical Re-Interventions	Tecnis ZM900 N=348*	
	n	%
Lens Related	**2**	**0.6%**
Lens removal due to halos/glare	1†Δ	0.3
Lens repositioning (image quality: blurry/hazy vision)	1‡	0.3
Not Lens Related	**10**	**2.9%**
Iris prolapse/wound repair	1	0.3
Lens exchange: - Lens power (refractive error)	3	0.9
- Incorrect lens type	1*	0.3
Macular hole repair	1	0.3
Vitrectomy/membrane peel for macular pucker	1	0.3
Trabeculectomy and two subsequent filtration bleb revisions	1*	0.3
Treatment injections for cystoid macular edema	2	0.6
TOTAL EYES	**12***	**3.4%**

* Includes excluded subject (lens exchange following implantation of non-study IOL) for adverse events only

† This subject also experienced a lens removal and pupilloplasty in the second eye due to halos and glare

Δ This subject eventually underwent a lens removal in both eyes due to halos and glare

‡ This subject eventually underwent lens removal in both eyes due to image quality (blurry/hazy vision)

* Subsequent events to endophthalmitis and hypopyon

Medical complications at 4-6 months and one year (persistent) for Tecnis® ZM900 first eyes are presented in Table 10. There was only one persistent event; one multifocal first eye of a unilateral subject was diagnosed with secondary glaucoma/raised intraocular pressure (IOP) requiring treatment beginning approximately five months postoperatively through the one-year study timeframe. The rate for raised IOP requiring treatment at one year is not statistically significantly higher than the FDA grid rate

(p=0.3743). Some medical complications were reported at 4-6 months; however, none of the rates were statistically higher than the one-year grid rates.

Table 10
Medical Complications and Adverse Events for the Tecnis ZM900 First Eyes at 4-6 Months and One Year (Persistent)

Persistent Adverse Event	ZM900				FDA Grid Rate
	4-6 Months N=333		One Year N=116		
	n	%	n	%	%
Macular edema	1	0.3	0	0.0	0.5
Corneal edema	1	0.3	0	0.0	0.3
Iritis	2	0.6	0	0.0	0.3
Raised IOP requiring treatment	1#	0.3	1#	1.0	0.4

Same eye

Visual Disturbances

Non-directed subject responses were obtained from the open-ended question, "Are you having any difficulties with your eyes or vision?" as asked by investigators at each study visit. Table11 presents the incidence of non-directed responses for optical/visual symptoms for first eyes in both lens groups at 4-6 months and one year postoperatively. The most reported optical/visual symptoms noted in the Tecnis® multifocal lens group were halos, with most reports being "mild" to "moderate." For monofocal first eyes, halos were also reported but with lower incidence and severity. Blurred/difficulty with vision was reported frequently in both lens groups; the majority of reports in the multifocal group were at intermediate distances and the majority of reports in the monofocal group were at near. Night glare and starburst were reported with higher frequencies in the multifocal group; however, most reports were noted as "mild" to "moderate". Lower rates were reported at the one-year visit compared to earlier study time points. Across both studies, three multifocal subjects (0.9%) underwent study lens removal; two resulting from halos/glare and one from dissatisfaction with image quality (blurry/hazy vision).

Table 11
Optical/Visual Symptoms* Pertaining to Visual Disturbances and Image Quality for First Eyes, Non-directed Responses at 4-6 Months and One Year

Optical/Visual Symptoms	Tecnis ZM900		Monofocal Control	
	4-6 Months N=333	One Year N=116	4-6 Months N=119	One Year N=116
Visual Disturbances				
Day glare	3.9%	5.2%	1.7%	1.7%
Floaters	4.2%	5.2%	4.2%	2.6%
Halos#	40.8% Mild = 16.5% Moderate = 15.3% Severe = 9.0%	22.4% Mild = 12.1% Moderate = 5.2% Severe = 5.2%	4.2% Mild = 2.5% Moderate = 1.7%	8.6% Mild = 6.0% Moderate = 2.6%
Night glare#	14.1% Mild = 5.1% Moderate = 5.4% Severe = 3.6%	15.5% Mild = 2.6% Moderate = 10.3% Severe = 2.6%	4.2% Mild = 2.5% Moderate = 1.7%	4.3% Mild = 1.7% Moderate = 0.9% Severe = 1.7%
Starburst#	8.1% Mild = 3.6% Moderate = 3.3% Severe = 1.2%	6.0% Mild = 3.4% Moderate = 2.6%	0.8% Mild = 0.8%	1.7% Mild = 1.7%
Night vision difficulty	3.3%	0.0%	0.0%	0.0%
Entoptic phenomena†	4.2%	1.7%	1.7%	1.7%
Image Quality				
Blurred/difficulty with vision	19.5% Overall = 3.3% Distance = 5.4% Intermediate = 11.1% Near = 2.4%	11.2% Overall = 0.9% Distance = 2.9% Intermediate = 6.9% Near = 1.7%	14.3% Overall = 4.2% Distance = 0.0% Intermediate = 0.8% Near = 9.2%	12.9% Overall = 2.6% Distance = 1.7% Intermediate = 0.9% Near = 7.8%
Cloudy/hazy/filmy/foggy vision	3.9%	2.6%	1.7%	2.6%
Decreased vision	3.9%	2.9%	1.7%	2.6%
Fluctuation in acuity	3.6%	2.6%	5.9%	2.6%

* Reported with incidence rates of 3.0% or higher for at least one lens group
† Includes reports of arcs of light, rings (not halos) in vision, lens shimmer, light reflection/streaks, etc.
# Some subjects reported more than one visual disturbance. Reports of severe halos, night glare or starbursts were noted for 11.7% (39/333) of first eyes and 11.5% (34/296) of second eyes at 4-6 months. At one year, reports of severe halos, night glare or starbursts were noted for 6.9% (8/116) of both first and second eyes.

Directed subject responses for optical/visual symptoms were also obtained from a sponsor-developed questionnaire administered by a third-party over the telephone in which subjects were asked to rate their degree of "difficulty" for specific visual disturbances. It should be noted that directed questionnaires may contain inherent over-reporting as directed questioning is more subjective and is designed to elicit responses whether or not these would be deemed by the subject significant enough to voluntarily discuss with the investigator and study staff (non-directed response). Nonetheless, when specifically asked, statistically significant differences ($p<0.0001$[a]) were found between lens groups with more difficulty experienced with night vision, glare/flare and halos for multifocal subjects compared to monofocal subjects (Table 12). Although more difficulty was noted with the multifocal lens with respect to nighttime visual symptoms, overall levels of subject satisfaction remained high (95% or more would choose the

[a] P-value was not adjusted for multiplicity.

same lens again when asked one year postoperatively) and exceeded that of the monofocal lens (as shown in the Subject Satisfaction/Quality of Life section in Clinical Study Effectiveness). With regard to other optical/visual symptoms, subject questionnaire results also yielded some statistically significant differences between groups for distorted near vision (in favor of the ZM900 lens), as well as distorted distance vision, and blurred distance vision (in favor of the control lens); however, the large majority of subjects in both lens groups reported no difficulty with these symptoms.

Table 12
Degree of Difficulty* Experienced with Visual Symptoms Without Glasses†
As Reported by Bilateral Subjects to a Prompted-Choice Questionnaire
At 4-6 Months and One Year**

	Tecnis ZM900		Monofocal Control	
Question	4-6 Months N = 292	One Year N =112	4-6 Months N=118	One Year N =115
Night Vision				
No Difficulty	44.3%	50.0%	70.4%	77.4%
Moderate Difficulty	43.6%	42.0%	27.0%	20.9%
Severe Difficulty	12.1%	8.0%	2.6%	1.7%
Glare/Flare				
No Difficulty	33.6%	40.2%	59.0%	72.2%
Moderate Difficulty	41.4%	37.5%	34.2%	24.3%
Severe Difficulty	25.0%	22.3%	6.8%	3.5%
Halos				
No Difficulty	30.1%	42.0%	77.8%	80.0%
Moderate Difficulty	34.6%	31.3%	14.5%	15.7%
Severe Difficulty	35.3%	26.8%	7.7%	4.3%

* Scale: No difficulty = score of 1 or 2, Moderate difficulty = score of 3, 4 or 5, Severe difficulty = score of 6 or 7
† Reported only for items with statistically significant ($p<0.0001$) distributions between lens groups.
** Note: Although more difficulty was noted (during third-party administered questionnaires) with the multifocal lens with respect to nighttime visual symptoms, overall levels of subject satisfaction remained high (95% or more would choose the same lens again when asked one year postoperatively) and exceeded that of the monofocal lens

2. Effectiveness Results

Distance Visual Acuity

Distance visual acuity was measured using ETDRS self-calibrating, retroilluminated boxes at a distance of 4.0 meters (13 feet) with the 100% ETDRS acuity charts under photopic lighting conditions (85 cd/m^2). Subjects were evaluated without correction and with best correction.

Monocular best corrected distance visual acuity results across both studies combined were well above the FDA grid rates at both 4-6 months and one year (Table 13).

Table 13: Monocular Best Corrected Distance Visual Acuity Proportion Achieving 20/40 or Better vs. FDA Grid

First Eyes	FDA Grid %	Tecnis ZM900				Monofocal Control			
		4-6 Months		One Year		4-6 Months		One Year	
		n	%	n	%	n	%	n	%
All	92.5	332/333	99.7	116/116	100.0	119/119	100.0	114/114	100.0
Best case	96.7	327/327	100.0	112/112	100.0	113/113	100.0	108/108	100.0

Monocular and binocular, uncorrected and best corrected distance visual acuities at 4-6 months and one year are presented by lens group across both studies in Tables 14 through 16.

Table 14: Monocular Distance Visual Acuity at 4-6 Months

Visual Acuity	Tecnis ZM900 N=333		Monofocal Control N=119	
	Uncorrected	Best Corrected	Uncorrected	Best Corrected
20/20 or better	31.2%	75.1%	39.5%	82.4%
20/25 or better	62.2%	94.3%	68.9%	94.1%
20/32 or better	82.6%	98.2%	90.8%	99.2%
20/40 or better	92.8%	99.7%	97.5%	100.0%
20/50 – 20/80	6.9%	0.3%	2.5%	0.0%
20/100 or worse	0.3%	0.0%	0.0%	0.0%

Table 15: Monocular Distance Visual Acuity at One Year

Visual Acuity	Tecnis ZM900 N=116		Monofocal Control N=114	
	Uncorrected	Best Corrected	Uncorrected	Best Corrected
20/20 or better	26.7%	69.8%	49.1%	84.2%
20/25 or better	60.3%	93.1%	77.2%	93.9%
20/32 or better	81.0%	99.1%	86.8%	100.0%
20/40 or better	91.4%	100.0%	97.4%	100.0%
20/50 – 20/80	6.9%	0.0%	2.6%	0.0%
20/100 or worse	1.7%	0.0%	0.0%	0.0%

Table 16: Binocular Distance Visual Acuity at 4-6 Months

Visual Acuity	Tecnis ZM900 N=294		Monofocal Control N=119	
	Uncorrected	Best Corrected	Uncorrected	Best Corrected
20/20 or better	56.1%	84.7%	75.6%	87.4%
20/25 or better	83.3%	98.0%	91.6%	98.3%
20/32 or better	95.9%	100.0%	98.3%	100.0%
20/40 or better	98.6%	100.0%	99.2%	100.0%
20/50 – 20/80	1.4%	0.0%	0.8%	0.0%
20/100 or worse	0.0%	0.0%	0.0%	0.0%

At 4-6 months and one year, mean uncorrected and best corrected, monocular and binocular distance visual acuities for the Tecnis® ZM900 lens were clinically comparable

to the monofocal control lens (Tables 17 and 18). Non-inferiority of the Tecnis® ZM900 multifocal lens for distance vision compared to the monofocal control lens was demonstrated as the lower limits of the confidence intervals of the mean differences were one line or less for uncorrected visual acuity and within one-half line for best corrected distance visual acuity.

Table 17: Monocular Mean Distance Visual Acuities

Distance Visual Acuity	Timeframe	Lens Group	N	Mean Snellen Equivalent	Mean Difference (ETDRS lines)	Mean Difference Lower 90% CI
Uncorrected	4-6 months	ZM900 Monofocal	333 119	20/27 20/25	-0.38	-0.615
	1 year	ZM900 Monofocal	116 114	20/28 20/24	-0.68	-0.997
Best Corrected	4-6 months	ZM900 Monofocal	333 119	20/20 20/19	-0.25	-0.402
	1 year	ZM900 Monofocal	116 114	20/21 20/19	-0.30	-0.495

Table 18: Binocular Mean Distance Visual Acuities

Distance Visual Acuity	Timeframe	Lens Group	N	Mean Snellen Equivalent	Mean Difference (ETDRS lines)	Mean Difference Lower 90% CI
Uncorrected	4-6 months	ZM900 Monofocal	294 119	20/22 20/20	-0.50	-0.688
	1 year	ZM900 Monofocal	114 114	20/22 20/20	-0.45	-0.664
Best Corrected	4-6 months	ZM900 Monofocal	294 119	20/18 20/17	-0.21	-0.360
	1 year	ZM900 Monofocal	114 114	20/18 20/17	-0.33	-0.508

Near Visual Acuity

Near visual acuity testing was performed in photopic (85 cd/m^2) and mesopic (3 cd/m^2) lighting conditions, monocularly and binocularly, with and without distance correction, using ETDRS near acuity charts held at both a fixed distance of 33 cm and also at the subject's preferred distance.

Mean near visual acuity results at 4-6 months are presented in Tables 19 and 20. Whether monocular or binocular, uncorrected or distance corrected, photopic or mesopic, mean near visual acuities for the multifocal lens group were statistically significantly better ($p<0.0001$ for all) than the monofocal control group by approximately four or more lines of near acuity. Near visual acuity results demonstrate the

effectiveness of the Tecnis® multifocal lens in providing substantial near vision compared to the monofocal control lens.

Table 19: Monocular Mean Near Visual Acuities at 4-6 months

Near Visual Acuity	Test Distance	Lens Group	N	Mean Snellen Equivalent	Difference in Means (ETDRS lines)
Uncorrected Photopic	33 cm	ZM900 Monofocal	333 119	20/30* 20/81	4.3
	Best	ZM900 Monofocal	332 119	20/28* 20/69	4.0
Distance Corrected Photopic	33 cm	ZM900 Monofocal	332 119	20/28* 20/86	4.9
	Best	ZM900 Monofocal	331 119	20/26* 20/76	4.6
Distance Corrected Mesopic	33 cm	ZM900 Monofocal	332 119	20/45* 20/134	4.8
	Best	ZM900 Monofocal	330 119	20/42* 20/123	4.7

* Statistically significant difference in mean ETDRS lines versus monofocal control ($p<0.0001$)

Table 20: Binocular Mean Near Visual Acuities at 4-6 months

Near Visual Acuity	Test Distance	Lens Group	N	Mean Snellen Equivalent	Difference in Means (ETDRS lines)
Uncorrected Photopic	33 cm	ZM900 Monofocal	294 119	20/25* 20/65	4.0
	Best	ZM900 Monofocal	292 119	20/23* 20/53	3.6
Distance Corrected Photopic	33 cm	ZM900 Monofocal	294 119	20/24* 20/69	4.6
	Best	ZM900 Monofocal	291 119	20/23* 20/64	4.5
Distance Corrected Mesopic	33 cm	ZM900 Monofocal	294 119	20/37* 20/111	4.7
	Best	ZM900 Monofocal	291 119	20/35* 20/104	4.7

* Statistically significant difference in mean ETDRS lines versus monofocal control ($p<0.0001$)

Mean best test distances for multifocal subjects were close to the theoretical value of 33.0 cm both monocularly and binocularly, with and without distance correction in place. Mean best test distances for monofocal subjects were 2-3 cm greater, on average, than the mean test distances for multifocal subjects.

Photopic (85 cd/m^2) uncorrected and distance corrected near visual acuity distributions are presented in Tables 21 through 23. In all cases, much larger proportions of multifocal subjects achieved better near visual acuities compared to monofocal subjects, with or without correction, monocularly or binocularly, at both the fixed distance of 33 cm

and at the subject's "best" distance. The true test of a multifocal optic is the evaluation of near vision with distance correction in place eliminating any effects from residual refractive error. With distance correction in place, 97-99% of Tecnis® ZM900 subjects achieved 20/40 or better at near, monocularly or binocularly, at the best test distance, compared to 7-19% of monofocal subjects.

Table 21: Monocular Photopic Uncorrected and Distance Corrected Near Visual Acuity at 4-6 Months

	Uncorrected				Distance Corrected			
	Tecnis ZM900		Monofocal		Tecnis ZM900		Monofocal	
Near Visual Acuity	33 cm N=333	Best N=332	33 cm N=119	Best N=119	33 cm N=332	Best N=331	33 cm N=119	Best N=119
20/20 or better	17.1%	26.2%	0.0%	0.0%	22.3%	31.4%	0.0%	0.0%
20/25 or better	44.4%	56.3%	1.7%	3.4%	56.0%	64.4%	0.0%	0.0%
20/32 or better	76.0%	85.8%	2.5%	7.6%	84.9%	89.1%	1.7%	3.4%
20/40 or better	91.0%	95.8%	7.6%	16.8%	94.9%	97.0%	5.0%	6.7%
20/50 – 20/80	8.4%	4.2%	49.6%	53.8%	4.5%	2.7%	43.7%	56.3%
20/100 or worse	0.6%	0.0%	42.9%	29.4%	0.6%	0.3%	51.3%	37.0%

Table 22: Monocular Photopic Uncorrected and Distance Corrected Near Visual Acuity at One Year

	Uncorrected				Distance Corrected			
	Tecnis ZM900		Monofocal		Tecnis ZM900		Monofocal	
Near Visual Acuity	33 cm N=116	Best N=116	33 cm N=113	Best N=113	33 cm N=116	Best N=116	33 cm N=113	Best N=113
20/20 or better	16.4%	27.6%	0.0%	0.0%	24.1%	34.5%	0.0%	0.0%
20/25 or better	37.1%	47.4%	0.9%	1.8%	53.4%	66.4%	0.0%	0.9%
20/32 or better	69.8%	75.9%	2.7%	5.3%	79.3%	81.9%	2.7%	4.4%
20/40 or better	83.6%	90.5%	6.2%	14.2%	95.7%	97.4%	6.2%	10.6%
20/50 – 20/80	14.7%	9.5%	46.0%	45.1%	4.3%	2.6%	42.5%	43.4%
20/100 or worse	1.7%	0.0%	47.8%	40.7%	0.0%	0.0%	51.3%	46.0%

Table 23: Binocular Photopic Uncorrected and Distance Corrected Near Visual Acuity at 4-6 Months

	Uncorrected				Distance Corrected			
	Tecnis ZM900		Monofocal		Tecnis ZM900		Monofocal	
Near Visual Acuity	33 cm N=294	Best N=292	33 cm N=119	Best N=119	33 cm N=294	Best N=291	33 cm N=119	Best N=119
20/20 or better	33.3%	45.9%	0.0%	0.8%	42.9%	49.8%	0.0%	0.0%
20/25 or better	75.5%	82.2%	1.7%	6.7%	79.6%	84.9%	0.0%	0.8%
20/32 or better	94.9%	96.6%	7.6%	17.6%	96.3%	97.3%	5.0%	8.4%
20/40 or better	99.0%	99.0%	21.0%	38.7%	98.3%	98.6%	13.4%	18.5%
20/50 – 20/80	0.7%	0.7%	63.9%	52.9%	1.7%	1.4%	59.7%	60.5%
20/100 or worse	0.3%	0.3%	15.1%	8.4%	0.0%	0.0%	26.9%	21.0%

Mesopic (3 cd/m^2) near visual acuity results were also in favor of the multifocal lens with the majority of multifocal subjects achieving 20/40 or better at near with distance correction in place under low light conditions (Table 24).

Table 24: Monocular and Binocular Mesopic Distance Corrected Near Visual Acuity at Best Distance at 4-6 Months

Near Visual Acuity	Monocular		Binocular	
	Tecnis ZM900 N=330	Monofocal N=119	Tecnis ZM900 N=291	Monofocal N=119
20/40 or better	63.6%	0.0%	78.7%	0.8%
20/50 – 20/80	31.8%	21.0%	20.3%	36.1%
20/100 or worse	4.5%	79.0%	1.0%	63.0%

Combination Distance and Near Acuities

Combination visual acuities represent the proportion of subjects who achieved both specific distance acuity and a specific near acuity simultaneously. Combined distance and near visual acuity results are presented for binocular subjects at 4-6 months for both the Tecnis® multifocal group and the monofocal control group in Figures 1 and 2. Statistically significant differences ($p<0.0001$ for all) were found between lens groups for the percent of subjects achieving both 20/40 or better distance and near (uncorrected and with distance correction) as well as for the percent of subjects achieving 20/25 or better distance and 20/32 or better near (uncorrected and with distance correction) with significantly more multifocal subjects achieving the specified visual acuities.

Figure 1
Combined 20/40 or Better Binocular Distance and Near Photopic Visual Acuity at 4-6 Months

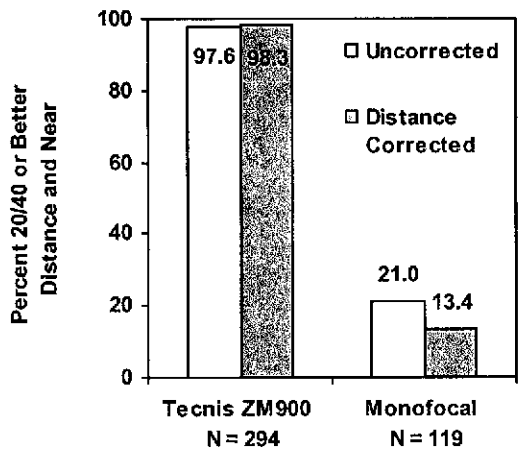
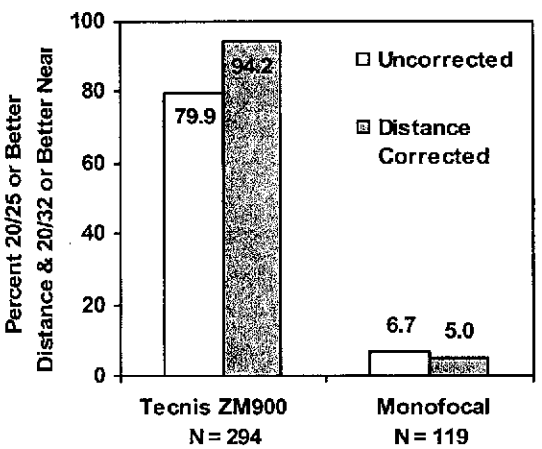


Figure 2
Combined 20/25 or Better Binocular Distance and 20/32 or Better Binocular Near Photopic Visual Acuity at 4-6 Months



Fundus Visualization

Investigators evaluated the ability to visualize the fundus following dilated fundus exams at the 4-6 month study visits. Fundus visualization for all eyes in both lens groups (100%; 333/333 multifocal first eyes; 119/119 monofocal first eyes) was deemed "adequate". No difficulties were reported in evaluating or treating retinal complications in multifocal eyes. Only one multifocal first eye underwent a surgical retinal procedure.

Subject Satisfaction/Quality of Life Evaluation

Two subjective questionnaires were administered to subjects to assess the impact of the lens on vision-related quality of life: a sponsor-developed questionnaire collected information regarding visual quality and subject satisfaction, and the Modified TyPE Specification for Cataracts (developed by Jonathan Javitt, M.D., M.P.H., in 1994) measured multifocal-specific quality of life impact information. The questionnaires were administered via telephone by trained interviewers following completion of clinical study exams preoperatively, at 4-6 months, and at one year. Interviewers were masked during the initial study as to the subject's lens group (monofocal or multifocal).

Figures 3 through 5 present the frequency of spectacle wear for bilateral subjects in both lens groups at 4-6 months. Spectacle independence rates for the Tecnis® ZM900 lens were statistically higher than the monofocal control for overall, distance and near spectacle usage ($p < 0.0001^a$). Spectacle independence rates at one year were similar to those at 4-6 months and statistically significant as well when compared to the monofocal control group ($p \leq 0.0066$).

Figure 3
Overall Frequency of Spectacle Wear
for Bilateral Subjects at 4-6 Months

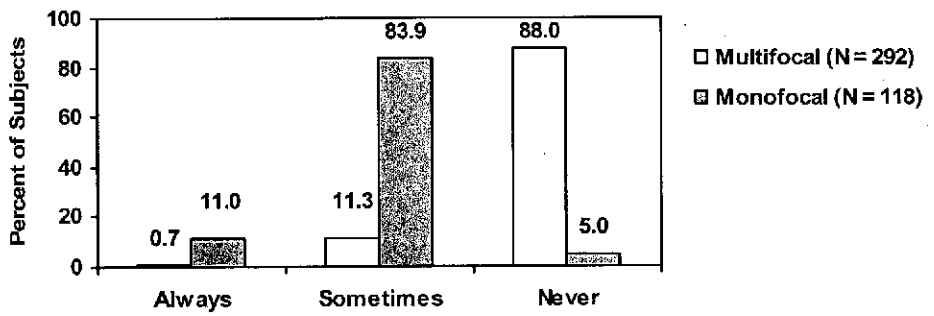


Figure 4
Frequency of Spectacle Wear for Distance Vision for Bilateral Subjects at 4-6 Months

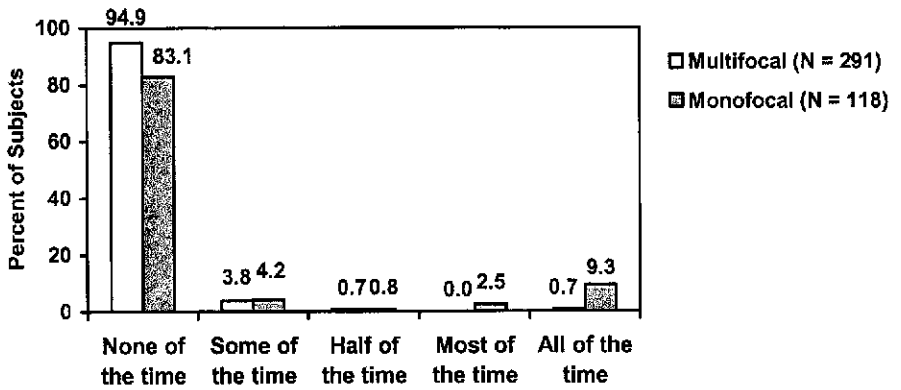


Figure 5
Frequency of Spectacle Wear for Near Vision for Bilateral Subjects at 4-6 Months

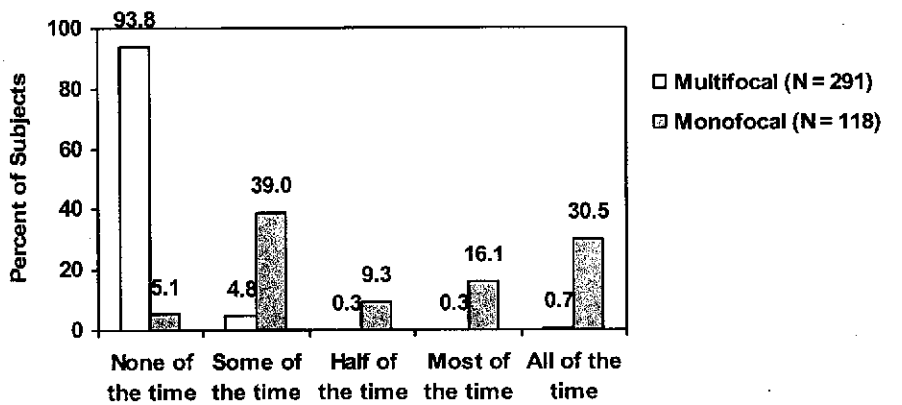


Table 25 presents subjects' ability to function comfortably without glasses. Statistically significant differences were found between lens groups ($p<0.0001$[a]) with more multifocal subjects functioning comfortably at near without glasses as compared to monofocal subjects at both 4-6 months and one year.

[a] P-value was not adjusted for multiplicity.

Table 25
Ability to Function Comfortably Without Glasses for Bilateral Subjects
Directed Responses to a Prompted Choice Questionnaire

Ability to function comfortably at	4-6 Months		One Year	
	Tecnis ZM900 N=292	Monofocal N=118	Tecnis ZM900 N=112	Monofocal N=115
Near	94.2%*	16.9%	96.4%*	30.4%
Intermediate	85.3%	94.9%	93.8%	84.2%
Distance	90.4%	94.9%	96.4%	98.3%

* Statistically significant difference vs. monofocal control

Subjects were asked about their desire to elect the same IOL again, if given the opportunity. As shown in Table 26, at both 4-6 months and one year, more multifocal subjects indicated they would elect the IOL again compared to monofocal subjects, although the difference was not statistically significant. The primary reasons subjects would not elect the IOL again were dissatisfaction with visual outcomes for both lens groups as well as optical/visual effects for the multifocal subjects and the need for glasses for monofocal subjects.

Table 26
Desire to Elect IOL Again for Bilateral Subjects
Directed Response to a Prompted Choice Questionnaire

	Tecnis ZM900				CeeOn 911A			
	4-6 Months N = 292		One Year N = 112		4-6 Months N = 118		One Year N = 115	
Elect IOL Again?	n	%	n	%	n	%	n	%
Yes	255	87.3	106	94.6	100	84.7	103	89.6
No	30	10.3	5	4.5	15	12.7	12	10.4
Undecided	7	2.4	1	0.9	3	2.5	0	0.0

Satisfaction with vision without glasses (Table 27) was assessed on a scale of 1-5, with 1 being "not at all satisfied" and 5 being "completely satisfied". At both 4-6 months and one year, statistically significant differences between lens groups were found in favor of the Tecnis® ZM900 for overall satisfaction ($p \leq 0.0052$[a]) and satisfaction with vision during the day ($p<0.0001$). Mean ratings for multifocal subjects were closer to "completely satisfied" and mean ratings for monofocal subjects were closer to "mostly satisfied". No differences between lens groups were noted for satisfaction with vision at night with mean ratings for both lens groups "mostly satisfied" or better.

[a] P-value was not adjusted for multiplicity.

Table 27
Mean Rating of Satisfaction With Vision Without Glasses for Bilateral Subjects
(on a scale of 1-5, with 5 being best)
Directed Responses to a Prompted Choice Questionnaire

Satisfaction With vision	4-6 Months		One Year	
	Tecnis ZM900 N=292	Monofocal N=118	Tecnis ZM900 N=112	Monofocal N=115
Overall	4.46*	4.20	4.59*	4.25
During the day	4.53*	4.19	4.65*	4.24
At Night	4.09	4.11	4.37	4.19

* Statistically significant difference vs. monofocal control

Subjects also rated their degree of trouble with vision without glasses in the day and at night (Table 28) on a scale of 1 to 5, with 1 being "no trouble at all" and 5 being "major or overwhelming trouble". At both 4-6 months and one year, significant differences were found in favor of the Tecnis® ZM900 lens group ($p<0.0001$) during the day with lower mean trouble ratings. At night, a significant difference ($p=0.0047$) was noted in favor of the multifocal lens at one year. However, postoperative scores for both lens groups were generally low with mean ratings between "no trouble" and "a little bit of trouble".

Table 28
Mean Rating of Trouble With Vision Without Glasses for Bilateral Subjects
(on a scale of 1-5, with 5 being worst)
Directed Responses to a Prompted Choice Questionnaire

Trouble With vision	4-6 Months		One Year	
	Tecnis ZM900 N=292	Monofocal N=118	Tecnis ZM900 N=112	Monofocal N=115
During the day	1.44*	1.80	1.23*	1.86
At night	1.97	1.89	1.63*	2.00

* Statistically significant difference vs. monofocal control

Subjects also rated their vision in general without glasses (Table 29) on a scale of 0 to 10 with zero being "worst possible vision" and 10 being "best possible vision". At both 4-6 months and one year, multifocal subjects rated their vision as significantly better than monofocal subjects overall ($p<0.0001$[a]).

[a] P-value was not adjusted for multiplicity.

Table 29
Mean Rating of Vision Without Glasses for Bilateral Subjects
(on a scale of 0-10, with 10 being best)
Directed Responses to a Prompted Choice Questionnaire

Rating of Vision	Tecnis ZM900		Monofocal	
	N	Mean Rating	N	Mean Rating
4-6 Months	292	8.67*	118	7.94
One Year	112	8.94*	115	7.86

* Statistically significant difference vs. monofocal control

3. Subgroup Analyses

Some examinations and substudies were only performed in the initial DIOL-101-TCNS study at the 4-6 month visit. These included evaluation of reading ability, a depth of focus substudy, contrast sensitivity testing and a nighttime driving performance substudy.

Evaluation of Reading Ability

Binocular reading acuity and speed were evaluated in the initial study using MNRead cards with distance correction in place under photopic lighting (85 cd/m^2) conditions at the subject's best distance. At one year, a statistically significant difference in mean binocular reading acuity was found between multifocal and monofocal control subjects ($p<0.0001$) with a mean Snellen reading acuity of 20/20 for multifocal subjects and 20/47 for monofocal control subjects (Table 30).

Table 30
Mean Binocular Distance Corrected Near Visual Acuity and Best Test Distance at One Year

IOL	N	Mean LogMAR	Snellen Equivalent	Mean Test Distance (cm)
ZM900	114	-0.01*	20	34.4*
Monofocal	113	0.37	47	41.1

* Statistically significant difference vs. monofocal control ($p<0.0001$)

Reading speed is a measure of reading performance determined by two factors: subject critical print size and maximum reading speed. The critical print size is the smallest print that a subject can read close to their maximum reading speed; the maximum speed is the subject's reading speed when reading is not limited by print size. Statistically significant differences in both mean critical print size ($p<0.0001$[a]) and mean maximum

[a] P-value was not adjusted for multiplicity.

reading speed (p=0.0007) were found in favor of the multifocal subjects (Table 31). Critical print size results indicate that on average, multifocal subjects were able to read near their maximum reading speed at three lines better than monofocal control subjects.

Table 31
Mean Critical Print Size and Maximum Reading Speed (Words Per Minute) at One Year

IOL	N	Mean Critical Print Size (LogMAR)	Snellen Equivalent	Mean Words Per Minute
ZM900	114	0.18*	30	148*
Monofocal	113	0.50	63	117

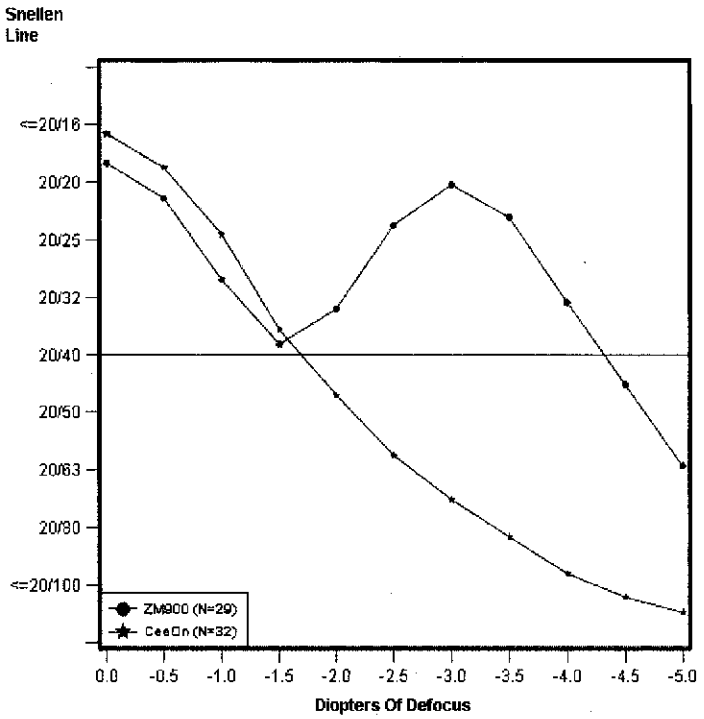
* Statistically significant difference vs. monofocal control (p≤0.0007)

Depth of Focus Substudy

Defocus curve testing was performed on a subset of 30 subjects from each lens group at the 4-6 month study exam in the initial study. The purpose was to evaluate binocular best corrected distance visual acuity defocus curves at three pupil sizes: ≤2.5 mm; >2.5 mm and <4.0 mm; and ≥4.0 mm, with 10 subjects per lens group per pupil size group. Defocus testing was performed using the best corrected distance refraction and defocusing the image in 0.5 diopter increments with spherical minus trial lenses up to -5.0 D. Because not many subjects were available with naturally small pupils ≤2.5 mm, a second substudy was implemented to pharmacologically constrict pupils with 1% pilocarpine for subjects who participated in depth of focus testing with their natural pupil size as well.

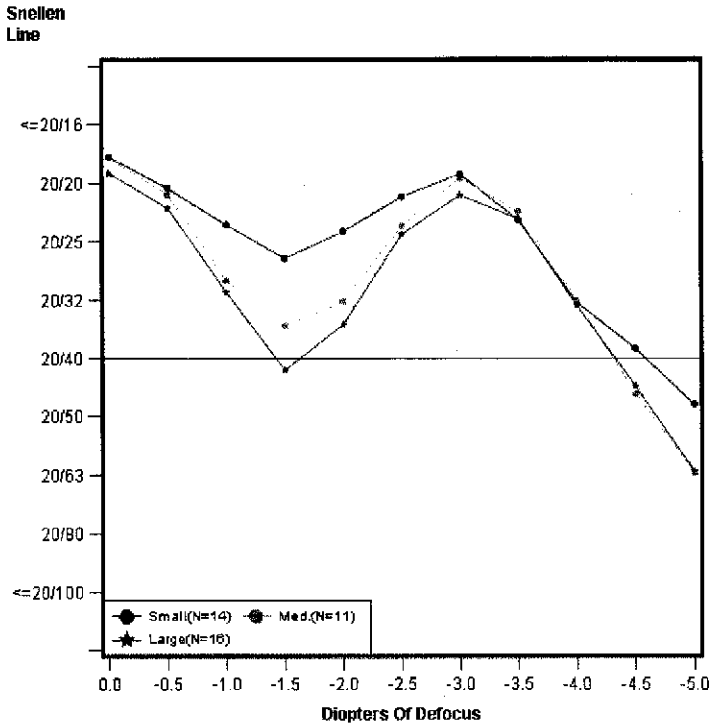
With a defocus range of plano to -5.0 D, multifocal subjects were found to have a significantly increased measured depth of focus compared to monofocal subjects overall (Figure 6). In all cases, a prominent near peak, essentially equivalent to the distance peak or plano refraction, occurs around -3.0 D for the multifocal subjects.

Figure 6
Mean Visual Acuity at Each Defocus Level for All Subjects at Their Natural Pupil Size



The depth of focus performance for the Tecnis® multifocal IOL strongly illustrates the multifocality of the optic design at any pupil size (Figure 7). Little pupil size effect was observed for multifocal subjects. Even at intermediate distances, depth of focus curves for all pupil size groups were generally 20/40 or better with the Tecnis® ZM900, indicating a large range of functional vision through 5.0 D of defocus. In summary, depth of focus was significantly increased for multifocal subjects compared to monofocal subjects with a substantial near peak evident for multifocal subjects for all pupil size groups.

Figure 7
Mean Visual Acuity at Each Defocus Level for Tecnis Multifocal Subjects by Pupil Size Group*



* Pupil Size groups: Small: ≤2.5 mm; Medium: >2.5 mm, <4.0 mm; Large: ≥4.0 mm

Contrast Sensitivity

Binocular best corrected distance contrast sensitivity testing was performed on subjects in the initial clinical study (N=110 multifocal subjects; N=109 monofocal control subjects) at the 4-6 month study exam using Functional Acuity Contrast Test (FACT) sine wave grating charts with the self-illuminated and self-calibrated Optec 6500 Vision Tester. Subjects were tested in three lighting conditions: mesopic (3 cd/m^2) with glare, mesopic without glare, and photopic (85 cd/m^2) with glare. Testing was performed twice for each subject for each lighting condition and spatial frequency and the results averaged.

Mean contrast scores for the multifocal lens group were less than that for the monofocal lens group under each lighting condition and spatial frequency (Table 32). Mean differences between lens groups ranged between 0.10 and 0.26 log units, with the majority under 0.20 log units. Except in one case, the lower limit of the 90% confidence intervals of the mean difference did not exceed 0.30 log units.

Table 32
Mean Best Case Binocular Log Contrast Sensitivity at 4-6 Months
Tecnis Multifocal and Monofocal Control Mean Log Scores
N = 110 ZM900; N = 109 Monofocal

Spatial Frequency	Lens Model	Mesopic Without Glare	Mesopic With Glare	Photopic With Glare
1.5 cpd	ZM900	1.54	1.25	Not tested
	Monofocal	1.64	1.36	Not tested
3.0 cpd	ZM900	1.63	1.29	1.60
	Monofocal	1.75	1.50	1.75
6.0 cpd	ZM900	1.56	1.23	1.64
	Monofocal	1.70	1.49	1.80
12.0 cpd	ZM900	0.95	0.85	1.23
	Monofocal	1.14	0.99	1.43
18.0 cpd	ZM900	Not tested	Not tested	0.77
	Monofocal	Not tested	Not tested	0.96

Contrast sensitivity results were also analyzed by pupil size; mesopic contrast sensitivity results were analyzed by mesopic pupil sizes and photopic contrast sensitivity results were analyzed by photopic pupil sizes. There was not a noticeable pupil size effect on contrast sensitivity for either multifocal or monofocal subjects under any lighting condition.

Nighttime Driving Performance Substudy

A night driving performance substudy was conducted in the initial study to assess functional performance differences between multifocal and monofocal IOL subjects. Binocular visual performance was measured during a driving simulation study under low visibility conditions with and without headlight glare conditions. The Night Driving Simulator (NDS) developed and validated by Vision Sciences Research Corporation (VSRC) was used to measure night driving visibility distances and evaluate driving safety in terms of critical stopping sight distance. Driving simulation results are presented for 26 multifocal subjects and 31 monofocal subjects.

The Night Driving Simulator included two driving scenes, a nighttime rural road and a nighttime city street. Six visual targets were used: two different road warning signs, two text signs and two road hazards (a pedestrian facing either left or right). The size and content of the signs and hazards varied requiring different detection and identification distances. The simulated visibility conditions for nighttime driving in rural and city roads were clear weather, inclement weather (fog), and glare conditions. The visibility

distances of the subjects under different viewing conditions were determined from subject perception times to detect and identify the targets in the rural and city scenes. Subjects pressed a button in response to detection of the target and then again at the point at which they could identify the target's details. The computer recorded the time from the start of the driving scene to the button response for detection and identification.

The results of night driving visibility distances are presented in Tables 33 and 34 for the rural road and in Tables 33 and 34 for the city street. In general, mean night driving visibility for detection and identification of text, warning and pedestrian targets was lower for multifocal subjects than for monofocal subjects. However, the mean percent loss in visibility distance for Tecnis® multifocal subjects compared to the monofocal control group was within 25% loss for most distances. The average percent loss exceeded 25% in rural roads mainly for identification distances of text signs under normal, fog and glare conditions, and for warning and pedestrian identification under conditions of glare only. In city roads, average percent loss in visibility distance was within 25% for detection and identification of all targets with the presence of visual clutter and background interaction.

Mean visibility distances can also be shown in terms of mean visibility times for sight stopping distances (also Tables 33 through 36) based on travel speeds in each roadway condition (55 MPH in rural and 35 MPH in city).

Table 33
Visibility Distance and Time for Rural Detection
N=26 for multifocal, N=31 for monofocal control

Visibility Condition	Target	Mean Visibility Distance (feet)		Difference (feet)	Mean % Loss	Mean Visibility Time (sec)	
		ZM900	Monofocal			ZM900	Monofocal
Normal	Text	715 ± 33	734 ± 19	19	2.6%	8.86	9.09
	Warning	668 ± 36	703 ± 29	35	5.0%	8.28	8.72
	Pedestrian	630 ± 39	667 ± 22	37	5.6%	7.81	8.27
Fog	Text	690 ± 32	709 ± 23	19	2.7%	8.55	8.79
	Warning	623 ± 32	658 ± 29	35	5.3%	7.73	8.16
	Pedestrian	616 ± 31	642 ± 38	26	4.1%	7.64	7.96
Glare	Text	645 ± 35	678 ± 28	33	4.8%	8.00	8.41
	Warning	591 ± 34	635 ± 27	44	6.9%	7.32	7.87
	Pedestrian	546 ± 75	621 ± 39	75	12.0%	6.77	7.70

Table 34
Visibility Distance and Time for Rural Identification
N=26 for multifocal, N=31 for monofocal control

Visibility Condition	Target	Mean Visibility Distance (feet)		Difference (feet)	Mean % Loss	Mean Visibility Time (sec)	
		ZM900	Monofocal			ZM900	Monofocal
Normal	Text	353 ± 85	479 ± 76	126	26.3%	4.38	5.94
	Warning	502 ± 70	583 ± 40	81	14.0%	6.22	7.23
	Pedestrian	455 ± 103	583 ± 67	128	21.9%	5.64	7.23
Fog	Text	281 ± 73	393 ± 65	112	28.5%	3.48	4.87
	Warning	426 ± 75	529 ± 69	103	19.5%	5.28	6.56
	Pedestrian	387 ± 109	495 ± 96	108	21.7%	4.80	6.14
Glare	Text	253 ± 82	392 ± 67	139	35.6%	3.13	4.86
	Warning	396 ± 95	526 ± 59	130	24.7%	4.90	6.52
	Pedestrian	335 ± 111	465 ± 91	130	27.9%	4.16	5.76

Table 35
Visibility Distance and Time for City Detection
N=26 for multifocal, N=31 for monofocal control

Visibility Condition	Target	Mean Visibility Distance (feet)		Difference (feet)	Mean % Loss	Mean Visibility Time (sec)	
		ZM900	Monofocal			ZM900	Monofocal
Normal	Text	279 ± 37	333 ± 44	54	16.2%	5.43	6.48
	Warning	297 ± 31	320 ± 32	23	7.1%	5.79	6.23
	Pedestrian	348 ± 89	358 ± 92	10	2.6%	6.78	6.97
Fog	Text	255 ± 49	300 ± 41	45	15.0%	4.97	5.85
	Warning	276 ± 28	303 ± 30	27	9.0%	5.37	5.90
	Pedestrian	326 ± 80	358 ± 88	32	8.9%	6.36	6.98
Glare	Text	229 ± 42	279 ± 32	50	17.8%	4.46	5.43
	Warning	266 ± 32	295 ± 32	29	9.9%	5.17	5.74
	Pedestrian	291 ± 69	326 ± 82	35	10.7%	5.66	6.35

Table 36
Visibility Distance and Time for City Identification
N=26 for multifocal, N=31 for monofocal control

Visibility Condition	Target	Mean Visibility Distance (feet)		Difference (feet)	Mean % Loss	Mean Visibility Time (sec)	
		ZM900	Monofocal			ZM900	Monofocal
Normal	Text	255 ± 30	312 ± 37	57	18.3%	4.96	6.07
	Warning	293 ± 33	320 ± 32	27	8.4%	5.70	6.23
	Pedestrian	324 ± 72	348 ± 82	24	7.1%	6.31	6.79
Fog	Text	219 ± 40	273 ± 32	54	19.7%	4.27	5.32
	Warning	269 ± 32	300 ± 30	31	10.2%	5.25	5.85
	Pedestrian	305 ± 65	343 ± 71	38	11.0%	5.95	6.68
Glare	Text	199 ± 57	263 ± 39	64	24.3%	3.88	5.12
	Warning	261 ± 35	293 ± 31	32	11.1%	5.08	5.71
	Pedestrian	276 ± 53	310 ± 65	34	10.9%	5.38	6.04

XI. SUMMARY OF SUPPLEMENTAL CLINICAL INFORMATION

The diffractive multifocal optic was evaluated in two prior European clinical registration studies of PMMA lens models with the same diffractive design as Tecnis® ZM900. Additionally, the Tecnis® multifocal IOL has been evaluated in some non-USA studies including a Japanese registration study and several European post-market studies, but these will not be summarized here, as they did not substantially contribute to the FDA decision process.

PMMA Diffractive Multifocal European Studies

Two European multicenter studies were conducted between 1993 and 1998 by Pfizer Pharmacia, the original product manufacturer, to evaluate the safety and effectiveness of two 12.0 mm PMMA diffractive multifocal lenses, Model 808X (6.5 mm optic) and Model 811X (6.0 mm optic). The diffractive multifocal surface of these lens models is identical to that of the Tecnis® multifocal IOL, Model ZM900. Together, the two European studies report on 419 monocular diffractive PMMA multifocal subjects (117 subjects in the 808X study; 302 subjects in the 811X study) with 388 at one year (116 in the 808X study; 279 in the 811X study). The results of the two European studies support the safety of the diffractive multifocal optic. Differences in lighting conditions made the relevance of acuity effectiveness outcomes of limited value with regard to the effectiveness of the ZM900 lens.

Both European studies were one-year, multicenter, open, unilateral, comparative parallel-group studies. Both studies included patients who were at least 50 years of age with cataract(s) and otherwise healthy eyes with keratometric astigmatism of 1.5 diopters or less. The initial study was conducted to evaluate safety and effectiveness of near and far vision compared to a monofocal lens; the second study was conducted to evaluate distance and near vision of the diffractive lens under low light conditions. The control lens used in the initial study was the PMMA equivalent monofocal lens (Model 808D). Any PMMA monofocal lens was allowed as the control lens in the second study. In both studies, distance visual acuity was measured using Snellen KCF charts, near vision was measured using Alza reading cards, and contrast sensitivity was evaluated using Vistech Vision Contrast charts.

Medical findings during the studies were similar to those reported for other PMMA (polymethyl-methacrylate) lens models. The most reported medical finding at one year was capsular fibrosis (11% for Model 808X and 21% for Model 811X). Nd:YAG capsulotomy rates reported in the European studies were 6.0% (7/117) for multifocal eyes and 3.7% (4/107) for monofocal eyes in the 808X study, and 10.6% (32/302) for multifocal eyes in the 811X study. In both studies, complication rates were within the 1983 FDA Grid rates in place at the time. None of the adverse events that occurred in the 808X and 811X studies (Table 37) were related to the diffractive multifocal optic.

Table 37 Adverse Events in Studies 808X and 811X with PMMA Lens Models

		808X Multifocal N=117		808X Monofocal N=109		811X Multifocal N=302	
ADVERSE EVENT		**n**	**%**	**n**	**%**	**n**	**%**
Acute Corneal Decompensation		1	0.9	1	0.9	1	0.3
Optic Atrophy	Optic Nerve Atrophy	-	-	-	-	1	0.3
	Ischemic opticopathy (retinopathy believed due to retrobulbar block)	-	-	-	-	1	0.3
Secondary Surgical Intervention: None Device-Related							
Retinal repair		-	-	2*	1.8	-	-
Reduction of iris prolapse		-	-	1	0.9	-	-
Repositioning of subluxed IOL		1	0.9	-	-	-	-
Lens explant (lens power)		-	-	-	-	1	0.3
TOTAL EYES		**2**	**1.7**	**4**	**3.7**	**4**	**1.7**

* Repair of retinal hemorrhage and retinal hole

Optical/visual symptoms were assessed by means of directed questions in the 808X study and the 811X study. The questions were the same in both studies with the exception of "night vision problems" which was only asked in the 811X study. At one year (Table 38), the most reported optical/visual symptoms were halos at distance (18.6% for lens Model 808X; 10.2% for lens Model 811X) and glare at distance (9.7% for lens Model 808X; 5.1% for lens Model 811X). Severity levels were not collected.

Table 38 Subject Reports of Visual Disturbances at One Year Directed Response

Visual Disturbance	808X Multifocal N = 113		808X Monofocal N = 99		811X Multifocal N = 275	
	n	%	n	%	n	%
Ghost images at distance	3	2.7	2	2.0	0	0.0
Ghost images at near	2	1.8	0	0.0	0	0.0
Double images at distance	0	0.0	1	1.0	0	0.0
Double images at near	0	0.0	1	1.0	0	0.0
Halos at distance	21	18.6	1	1.0	28	10.2
Halos at near	3	2.7	0	0.0	9	3.3
Glare at distance	11	9.7	7	7.1	14	5.1
Glare at near	1	0.9	2	2.0	5	1.8
Color disturbance at distance	1	0.9	1	1.0	0	0.0
Color disturbance at near	1	0.9	1	1.0	0	0.0
Distortion at distance	0	0.0	0	0.0	1	0.4
Distortion at near	0	0.0	0	0.0	1	0.4
Blurring at distance	1	0.9	2	2.0	9	3.3
Blurring at near	2	1.8	2	2.0	3	1.1
Other at distance	5	4.4	1	1.0	6	2.2
Other at near	4	3.5	1	1.0	3	1.1
Night vision problem at distance	*	-	*	-	8	2.9
Night vision problem at near	*	-	*	-	3	1.1

*Question not asked in 808X study.

Subject satisfaction was assessed in both studies using the same questions regarding quality of vision, overall satisfaction, whether or not to elect the same IOL again, and spectacle independence. Subject satisfaction was similar between studies with regard to quality of vision (81-95% "good" vision in various circumstances), overall satisfaction (94-95% "good") and whether or not to elect the IOL again (97-99%). Satisfaction results for the monofocal lens group in the 808X study were comparable to those with the multifocal lens although slightly higher for distance vision satisfaction and slightly lower for near vision satisfaction, overall satisfaction, and whether to elect the IOL again. Complete spectacle independence for the multifocal lens was much greater in the 811X study (54%) compared to the 808X study (37%) although mean refractive spherical equivalent (MRSE) and refractive cylinder were comparable with these rigid, large-incision PMMA IOLs. However, complete spectacle independence rates for both multifocal lens models were still greater than that reported for the monofocal control lens (1%), as would be expected.

Best corrected distance vision with the multifocal lens was similar to the monofocal lens (as tested in the 808X study). Near vision, uncorrected or distance corrected, was far superior in the multifocal group. There were no safety concerns with respect to the multifocal optic design in either study.

XII. PANEL MEETING RECOMMENDATION AND FDA'S POST-PANEL ACTION

Not applicable. This device was not a candidate for review by the FDA Ophthalmology Devices Advisory Panel.

XIII. CONCLUSIONS DRAWN FROM PRECLINICAL AND CLINICAL STUDIES

A. Safety Conclusions

The US clinical studies, when combined with the two European clinical studies of the diffractive optic, provide reasonable assurance of the safety of the Tecnis® ZM900 lens. The U.S. clinical studies of the Tecnis® ZM900 lens had three (0.9%; 3/348) subjects who underwent secondary surgical reinterventions related to the optical properties of the MIOL. The European clinical studies of the 808X/811X PMMA lenses with the identical diffractive optic had no secondary surgical reinterventions related to the optical properties of the MIOL. Medical findings for the Tecnis® ZM900 lens throughout the USA studies were similar to those for the monofocal lens and not statistically significantly different than FDA grid rates, indicating that the difference in optical surface design for the Tecnis® ZM900 lens does not impact the safety of the lens with respect to general medical outcomes. The Sensar® IOL, the same material as the acrylic Tecnis multifocal IOL, has previously demonstrated the safety of the material in terms of adverse event rates in a prior PMA approval (P980040). The CeeOn® IOL, the same material as the silicone Tecnis multifocal IOL, has previously demonstrated the safety of the material in terms of adverse event rates in a prior PMA approval (P990080). Optical/visual phenomena such as glare and halos were noted more often in the Tecnis® ZM900 lens group than the monofocal control lens group, as is the case with other multifocal lenses; however, subject satisfaction levels were high and only 1% of subjects experienced lens-related adverse events as a result of the multifocal optic. Reductions in contrast sensitivity and night driving ability were detected as is the case with other multifocal lenses.

B. Effectiveness Conclusions

The overall effectiveness of the Tecnis® ZM900 lens has been demonstrated in the US clinical studies with the ability of the lens to provide near vision with improvements of at least four lines compared to a monofocal lens as well as good simultaneous distance

and near vision. Additionally, an expanded depth of focus was demonstrated compared to a monofocal lens with significant distance and near peaks as well as functional vision at intermediate distances regardless of pupil size. Multifocal subjects also demonstrated better reading ability than the monofocal controls without near vision correction, high levels of subject satisfaction, and more spectacle independence.

C. Overall Conclusions

The results of both preclinical and clinical evaluations demonstrate the safety and effectiveness of the silicone Tecnis® multifocal lens model. The results of the preclinical testing demonstrate the safety of the materials for the silicone lens Model ZM900 as established by laboratory testing, animal studies, and physicochemical testing. Additionally, the safety of materials is supported by the long history of clinical use of these materials in other currently marketed intraocular lenses. Additionally, the results of the Tecnis® multifocal clinical studies demonstrate the safety and effectiveness of the Tecnis® multifocal lens in providing corrected distance vision equivalent to a monofocal lens, depth of focus greater than a monofocal lens, good near vision, good simultaneous distance and near vision, and subject satisfaction, while demonstrating low rates of lens-related adverse events and complications. Based on these results, there is reasonable assurance of the safety and effectiveness of the Tecnis® multifocal lens in support of market approval.

The acrylic Tecnis® multifocal lens Model ZMA00 is a minor (material) modification of model ZM900. Therefore, additional clinical data was not warranted.

XIV. CDRH DECISION

CDRH issued an approval order on January 16, 2009.

The applicant's manufacturing facility was inspected and found to be in compliance with the device Quality System (QS) regulation (21CFR 820).

V. APPROVAL SPECIFICATIONS

Directions for use: See device labeling.

XVI. REFERENCES

1. Hutz, W. et al., Reading ability with 3 multifocal intraocular lens models. J. Cataract Refract Surg. 2006 Dec; 32(12):2015-2021.

2. Mester, U. et al., Functional outcomes after implantation of the Tecnis ZM900 and Array SA40 multifocal intraocular lenses. J. Cataract Refract Surg. 2007 June; 33(6):1033-1040.