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Three-Year Longitudinal Survey Comparing Visual Satisfaction with LASIK and Contact Lenses

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Purpose: To assess patient satisfaction and perceived outcomes with different methods of refractive error correction through annual surveys administered over a 3-year period.

Design: Prospective, longitudinal, parallel-group, multicenter survey.

Participants: A total of 1800 subjects, aged 18 to 60 years, who had LASIK or continued using contact lenses.

Methods: Twenty sites across the United States enrolled subjects who completed a study-specific baseline survey during a contact lens examination or while being evaluated as a candidate for LASIK. Links to follow-up surveys were emailed annually for 3 years. Between-group differences were assessed by analysis of variance, and associations were assessed by logistic multivariate regression.

Main Outcome Measures: Visual satisfaction.

Results: Of 1800 subjects, 694 (39%) comprised the control group who continued contact lens wear, 819 (45%) wore contacts at baseline and had LASIK, and 287 (16%) wore glasses at baseline and had LASIK. Most contact lens users had worn them successfully ≥5 years. The proportion expressing strong satisfaction with their current vision correction method decreased from 63% at baseline to 54% at year 3 in the contact lens control group, whereas 88% of former contact lens wearers and 77% of former glasses wearers were strongly satisfied with LASIK at year 3. Patients 40 years of age or younger when they had LASIK were somewhat more likely to be strongly satisfied than older patients. LASIK significantly reduced difficulties with night driving and nighttime visual disturbances among former contact lens users and former glasses users. The proportion with dry eye symptoms at 1, 2, or 3 years after LASIK was not significantly increased relative to baseline contact lens wear but was significantly increased relative to baseline glasses use, consistent with many glasses users having tried and abandoned contact lenses because of latent dry eye problems. Compared with continued contact lens wear, LASIK significantly reduced the self-reported rates of eye infections, ulcers, and abrasions each year.

Conclusions: Compared with contact lens wear, current LASIK technology improved ease of night driving, did not significantly increase dry eye symptoms, and resulted in higher levels of satisfaction at 1, 2, and 3 years follow-up. *Ophthalmology 2016;■:1–8 © 2016 by the American Academy of Ophthalmology.*

Supplemental material is available at www.aaojournal.org.

Clinically important myopia, hyperopia, or astigmatism is estimated to affect half of the adult population in the United States.[1] Any vision correction option, including spectacles, contact lenses, or refractive surgery, has unique risks and benefits. For the general public, contact lenses are popular, especially among children and young adults, because many think they provide more functional or aesthetic vision correction than spectacles. Surgical correction of refractive error can be preferable for patients who do not want the expense and maintenance responsibility of optical correction and for those in the military or who work/live in dirty environments or conditions of possible trauma.[2] An estimated 40.9 million persons in the United States aged ≥18 years wear contact lenses (16.7% of US adults),[3] and 0.62 to 0.72 million LASIK procedures were performed annually in the United States between 2010 and 2014.[4]

The efficacy and safety of LASIK have been demonstrated in clinical trials,[5,6] perhaps most definitively in the LASIK Quality of Life Collaboration Project PROWL-1 and PROWL-2 studies organized by the US Food and Drug Administration.[7] However, because it is a surgical procedure, there is a natural tendency to compare the outcomes with the best preoperative optically corrected vision and—for some patients—with their idea of vision in a hypothetical perfect eye. Therefore, it is important to establish an appropriate benchmark with which to compare outcomes. Previous studies have assessed patient-perceived outcomes with LASIK,[7–13] but to our knowledge none has had a control group that continued using

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contact lenses. The purpose of this study was to assess perceived benefits and risks with LASIK and contact lenses by comparing visual satisfaction before and for a period of 3 years after LASIK with that in a control group consisting of people who continued to use contact lenses as their primary method of vision correction.

Methods

This was a prospective, multicenter, longitudinal survey study. Twenty centers in the United States enrolled participants between November 2010 and March 2013. The study was conducted in accordance with the Declaration of Helsinki, and an independent or institutional review board approved the conduct of the study. All participants provided written informed consent.

Inclusion/Exclusion Criteria

The inclusion criteria were English-speaking subjects between the ages of 18 and 60 years with myopia, hyperopia, or astigmatism who used contact lenses or planned to undergo LASIK for vision correction. Exclusion criteria were a diagnosis of keratoconus, abnormal topography, multifocal treatment, or any significant visual problem other than myopia, hyperopia, or astigmatism. No restrictions were placed on the type of contact lenses used or on the types of excimer lasers or flap creation methods used with LASIK to broadly sample self-reported outcomes with any devices that were currently in use.

A total of 1882 eligible subjects were enrolled. Those who had a refractive surgical procedure other than LASIK (n = 20) and those who wore glasses at baseline and did not elect to have LASIK (n = 62) did not meet the criteria for continued enrollment in this longitudinal study, so they were withdrawn from the study and their baseline survey responses were excluded from the data analysis. Thus, responses were tabulated from 1800 participants.

Study Procedures

Potential subjects were invited to enroll in the study if they were continuing in contact lenses or being evaluated for LASIK. Those being evaluated for LASIK completed the baseline survey before undergoing surgery. The baseline Internet-based survey was administered while subjects were at the study site. The site study coordinator recorded each subject's refractive error and the date of surgery if the subject had LASIK. A link to a follow-up survey was automatically emailed to each subject annually along with several follow-up reminders, and several years into the study we added text message reminders as well.

Survey Instrument

The baseline study-specific survey included questions about demographics and contact lens use. Questions about visual satisfaction and symptoms were asked at baseline and repeated on the annual follow-up surveys. The questions were adapted from publicly available questionnaires on the basis of their perceived relevance to the study population. In particular, the selected questions focused on concerns that have been raised in the past about LASIK, including night-driving vision, visual symptoms such as starbursts and haloes at night, difficulty reading small print, dry eyes, and depression.[9,11–13] The responses to each question were compared between groups rather than being combined into a scoring system.

Data Analysis

Survey responses were tabulated to provide descriptive statistics about each vision correction group (i.e., those continuing contact lens wear, those wearing contacts at baseline before having LASIK, and those wearing spectacles at baseline before having LASIK). Responses were compared between groups using analysis of variance, and the significance of respondent characteristics within study groups (i.e., age and spherical equivalent refraction) was assessed with logistic multivariate regression. Statistical analysis was performed with Statistical Analysis Software (SAS Version 9.4, SAS Institute, Cary, NC). The significance threshold for individual comparisons was $P < 0.01$.

Results

Demographics

Twenty sites across the United States (listed in the Appendix, available at www.aaojournal.org) enrolled 1800 subjects who met protocol criteria; 694 (39%) comprised the control group who continued contact lens wear, 819 (45%) were contact lenses users who had LASIK, and 287 (16%) were glasses wearers who had LASIK. Of the 1106 subjects who had LASIK, 1063 (96%) had bilateral treatment and 43 (4%) had unilateral treatment. Overall, 1558 participants (87%) completed 1 or more annual follow-up surveys. The 1-, 2-, and 3-year surveys were completed by 1265 (70%), 1075 (60%), and 1375 (76%) participants, respectively.

Table 1 shows the baseline demographics and refractive distribution of the study participants. Those who wore spectacles were older on average and had a lower mean spherical equivalent refraction than the contact lens wearers. Approximately two thirds of the contact lens wearers were female, whereas more than half of those wearing spectacles at baseline were male. The duration of contact lens use and type of lenses worn were well balanced across the control group who continued contact lens wear and the group of contact lens users who subsequently had LASIK.

At baseline, 42% reported a history of allergies, 16% used migraine medication, 8% used a steroid inhaler, and 6% used oral steroids. Among those with allergies, 40% had hay fever and 23% reported that they often used allergy medication. The proportions did not differ significantly among the 3 vision correction groups for any of these characteristics.

Defection from Contact Lens Use

On each of the 1-, 2-, and 3-year surveys, between 17% and 25% of the control group who continued contact lens wear reported that they had decreased their lens wearing time during the previous year. Of the 694 participants who planned to continue contact lens wear at the baseline examination, 96 (14%) reported that they quit using contacts at some point during the 3-year follow-up period; 73 changed to glasses, and 23 had refractive surgery. Any survey responses received from these patients after they said they quit using contacts as the primary means of vision correction were not included in the subsequent reported averages for the control group. Of the 96 defectors, 38 provided reasons; 18 (47%) quit because of dryness or irritation, 11 (29%) quit because of visual difficulty with astigmatism correction, 4 (11%) quit because of infections or eye injuries, and 5 (13%) quit for other individual reasons.

Overall Satisfaction with LASIK versus Contact Lenses

Strong agreement with the statement "I would recommend my current method of vision correction to a close friend or family