Comparing the Vitreous Floaters Functional Questionnaire to the VFQ-25 in Vision Degrading Myodesopsia from Vitreous Floaters

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• PURPOSE: To compare the Vitreous Floater Functional Questionnaire (VFFQ-23) to the NEI Visual Function Questionnaire (VFQ-25) in patients with vision degrading myodesopsia (VDM) from vitreous floaters. Composite scores for each questionnaire were compared in asymptomatic controls, patients who chose observation (OBS), and those electing vitrectomy. The impact of limited refractive vitrectomy (LRV) on the composite scores of each questionnaire was determined.

• DESIGN: A retrospective study comparing questionnaire correlations with management choice (OBS or LRV), and a prospective, non-randomized, interventional case series.

• SUBJECTS: 74 subjects were asymptomatic controls; 193 subjects had bilateral floaters: 139 chose OBS, 54 elected LRV surgery.

• METHODS: Patients complaining of bilateral "*floaters*" completed the VFFQ-23 and VFQ-25 questionnaires and composite scores were correlated with visual acuity (VA), contrast sensitivity (CS), quantitative ultrasonography (QUS), and management choice (OBS or LRV). LRV was performed in 54 patients, and all tests were repeated at 6, 12, 24, and 36 months post-operatively.

• MAIN OUTCOME MEASURES: VFFQ-23 (0 to 100), NEI VFQ-25 (0 to 100), VA (Snellen), CS (Freiburg Acuity Contrast Test), QUS (AU), predictive value, Receiver Operator Characteristic areas under the curve (AUC), decision curve analysis (DCA).

• RESULTS: VFFQ-23 correlated with CS ($R = -.619$; $P < .0001$) and QUS ($R = -.632$; $P < .0001$). VFFQ-23 correctly identified 89% of patients who chose LRV with a positive predictive value of 73.8% for LRV and 95.3% for OBS, while VFQ-25 had a positive predictive value of only 60%; VFFQ-23 AUC = 0.923, VFQ-25 AUC = 0.570. DCA demonstrated a higher net benefit for VFFQ-23 than both "Treat All" and "Treat None" strategies. After LRV, VFFQ-23 improved 72.2% ± 3.2% ($P < .001$), while VFQ-25 only improved 7.4% ± 1.8%, ($P < .001$). The difference-in-differences before and after surgery between VFFQ-23 and VFQ-25 was 31.9 ± 12.0 ($P < .001$).

• CONCLUSIONS: In patients with vitreous floaters, the VFFQ-23 correlated with CS and QUS. VFFQ-23 was a better predictor of patient management choice (OBS or LRV) and was more sensitive to post-operative improvement than VFQ-25. VFFQ-23 superiority to VFQ-25 was confirmed by DCA. Thus, VFFQ-23 may be more useful in assessing the subjective impact of floaters on visual quality-of-life, in screening/triage, and as an outcome measure of current and future therapies for VDM. (Am J Ophthalmol 2026;286: 81–89.

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INTRODUCTION

Floaters are hair- or fly-like obscurations in vision at times appearing as cobwebs, but occasionally having a "glass noodle" appearance due to remnants of fetal blood vessels.[1,2] Studies have found that vitreous floaters can significantly impact visual quality-of-life (QoL).[3-6] Posterior vitreous detachment (PVD) is the most common etiology of vitreous floaters in older individuals,[3,4,7-9] while the most common cause in younger people is myopic vitreopathy,[10-12] where fibrous liquefaction with aggregation of collagen fibrils and PVD occur earlier in life.[13-16]

Patients complaining of bothersome vitreous floaters usually have degradation in contrast sensitivity (CS)[4-6,8,17] that correlates with increased vitreous density as measured by quantitative ultrasonography (QUS).[18,19] Since QUS has recently been shown to correlate with vitreous light scattering,[20] this test is an accurate clinical surrogate for measuring light scattering *in vivo*. The term "*Vision Degrading Myodesopsia*" (VDM) refers to clinically significant

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cases which are diagnosed on the basis of these objective quantitative metrics.[1,11] However, since people have varying perceptions of disturbances to their health[21] it is difficult to accurately determine the impact of VDM from vitreous floaters on QoL based solely upon a patient's history. This impediment may have colored the experience of some ophthalmologists to regard patient complaints of vitreous floaters as overblown.

Recently, an informative method of assessing subjective patient disturbance from vitreous floaters was developed and validated, called the *Vitreous Floaters Functional Questionnaire* (VFFQ-23).[22] The present study was undertaken to compare the VFFQ-23 to the NEI Visual Function Questionnaire (VFQ-25)[23,24] in terms of the relative correlations of the 2 questionnaires with vision (visual acuity (VA) and CS), vitreous structure assessed by quantitative ultrasonography, and patient management choice (observation (OBS) vs. limited refractive vitrectomy (LRV)). Questionnaire findings in the LRV group quantified Q-o-L changes post-operatively. Since the VFFQ-23 is specifically designed to evaluate floaters and the VFQ-25 assesses general vision, it is hypothesized that the VFFQ-23 will be superior to the VFQ-25 in several, if not all, of these comparisons.

METHODS

This study was conducted in patients with bilateral symptomatic vitreous floaters evaluated at the VMR Institute for Vitreous Macula Retina in Huntington Beach, California (JS). Institutional Review Board (IRB) approval was granted by the Providence St. Joseph Hospital IRB and written informed consent was obtained from each subject. This study adhered to the principles of the Health Insurance Portability and Accountability Act (HIPAA) and was conducted in accordance with the ethical principles of the Declaration of Helsinki.

Correlations between the questionnaires and visual function (VA and CS) and vitreous structure (QUS) were evaluated retrospectively. Changes in the composite scores of the 2 questionnaires in patients who underwent LRV surgery were analyzed prospectively.

SUBJECTS

The study population for retrospective analyses consisted of all patients who presented to the VMR Institute for Vitreous Macula Retina in Huntington Beach, California between 2013 and 2024 with the chief complaint of bilateral "floaters", met the inclusion/exclusion criteria, and who completed both questionnaires at study entry. For the prospective analyses, operated patients had to be evaluated with all testing prior to any intervention, had to have undergone bilateral (on separate occasions) limited refractive vitrectomy (JS), and completed both questionnaires at study entry as well as on 4 subsequent occasions over a 3-year post-op period to be included in the study. Meeting these criteria were 193 subjects (99 males and 94 females; age range 19 to 95 years) with a subjective duration of floaters prior to study entry = 57.9 +/- 68.7 months. Exclusion criteria were exudative maculopathy, diabetic retinopathy, glaucoma, retinal detachment, keratopathy, or any co-morbidities that could affect contrast sensitivity or alter vitreous structure. Patients with a history of YAG laser vitreolysis or vitrectomy (for any related or unrelated condition(s)) were excluded. Patients with multifocal intraocular lenses were excluded due to potential effects on contrast sensitivity. There were 74 asymptomatic control subjects (39 males and 35 females) who completed both questionnaires and underwent contrast sensitivity testing as well as quantitative ultrasonography. Repeatability was tested in 24 OBS subjects who had all testing done on 3 separate occasions: study entry, 1 year, and 2 years later.

Patients electing LRV underwent sutureless 25-gauge pars plana vitrectomy (Constellation, Alcon, Fort Worth, Texas) performed under local anesthesia, as previously described.[7,17,19,25] In cases where the posterior vitreous was still attached to the fundus, PVD was not intentionally induced to reduce the risk of iatrogenic retinal breaks and detachment,[7,17,19,26] as well as to minimize post-operative elevation of intravitreal oxygen levels that can promote cataractogenesis. In phakic patients, 3-4 mm of retrolental vitreous was left intact to further mitigate cataract formation.[27-30]

CLINICAL TESTING

Since all experimental subjects had bilateral floaters, the results of visual function testing and vitreous structure assessments with ultrasound were averaged for the 2 eyes and results presented per subject (see tables and graphs).

• **VISUAL FUNCTION TESTS:** Best corrected visual acuity (VA) was measured using a standard backlit ETDRS chart. Contrast sensitivity (CS) was measured as previously described.[7,8,9,10,11,17,18,19] After dark adapting, patients were tested in a dark room on a LED computer monitor using the open-source software, Freiburg Visual Acuity and Contrast Test (FrACT; https://michaelbach.de/fract/).[31-33] FrACT uses psychometric methods combined with anti-aliasing and dithering[34] using an 8-position tumbling Landolt C with varying levels of contrast sensitivity to provide an accurate thresholding assessment of contrast sensitivity. Screen size and testing distance (2.9 meters from stimulus) were measured and calibrated to the software settings. Results are reported as the Weber threshold: $\%Weber\ (\%W) = 100 \times \frac{Luminance_{max} - Luminance_{min}}{Luminance_{max}}$

• **VITREOUS STRUCTURE ASSESSMENT:** Ultrasonography was performed to diagnose the presence of PVD and quantify vitreous echodensity, as previously described.[7-11,17-20] A clinical ophthalmic ultrasound system (AVISO, Quantel Medical, Clermont-Ferrand, France) with a customized 15-MHz single-element transducer, a 6-dB bandwidth extending from 9.5 to 20 MHz, a 20-mm focal length, and a 7-mm aperture acquired 100 total frames at 16 frames/second. QUS processing was performed on the frames devoid of artefacts in the same manner as previously described.[7-11,17-20] Analyses generated 3 parameters: the sum of the square of the acoustic values within the central/posterior vitreous divided by the area of measurement ("*energy*", E); the percentage of the central/posterior vitreous filled by echogenic clusters greater than 50 pixels or 0.069 mm ("*P50*"); and the mean of the acoustic values divided by the area of the central/posterior measurement area ("*mean*", M). As previously described, [7-11,17-20] a composite of these 3 parameters was calculated as:

$$\textbf{QUS composite index} = [\tfrac{1}{2}\mathbf{E} + (\mathbf{M}\ \mathbf{x}\ 10) + (\mathbf{P}50 \times 100)]\ \textit{Arbitrary Units (AU)}$$

• **PATIENT REPORTED OUTCOME (PRO) MEASURES:** Self-administered questionnaires were completed by each patient before any clinical testing. Each questionnaire's composite score ranged from 0 to 100, with higher scores indicating greater visual satisfaction and better perceived visual QoL.

• **NATIONAL EYE INSTITUTE VISUAL FUNCTION QUESTIONNAIRE (VFQ-25):** The NEI VFQ-25 is a self-administered questionnaire designed to measure the influence of visual disability and visual symptoms on general health domains.[23,24] It consists of 25 questions assessing the impact of visual impairment on various aspects of daily life. The NEI VFQ-25 is commonly used in research to evaluate outcomes of treatments for eye diseases such as glaucoma,[23,35] cataracts,[23,31] and macular degeneration.[36] Respondents rate their visual function and the degree to which vision problems affect their well-being, subjective visual experience, and vision-related overall Q-o-L. The VFQ-25 composite score was calculated using established scoring guidelines.[29,30,32]

• **VITREOUS FLOATER FUNCTIONAL QUESTIONNAIRE (VFFQ-23):** The VFFQ-23 is a 23-item, self-administered questionnaire developed as a PRO measure to assess how vitreous floaters affect daily visual activities. Every item includes the word "floaters" to ensure the focus remains solely on floater-related symptoms.[22] Refined using Rasch analysis, the VFFQ-23 is unidimensional, locally independent, and well-targeted to the floater patient population. VFFQ-23 composite scores were calculated based on a Rasch-calibrated analysis as previously described.[22]

STATISTICAL ANALYSES

Multiple variable logistic regression analysis (SPSS; IBM) was used to determine differences in demographics (gender: male or female) and clinical findings (myopia, PVD, lens status) between OBS and LRV groups. Test-retest reliability was determined using single-measurement, absolute-agreement, 2-way, mixed-effects intraclass correlation coefficient analyses (SPSS, IBM). Two sample t-tests were used to determine differences in quantitative values of age, CS, QUS, VFFQ-23, and VFQ-25 composite scores between OBS and LRV subjects. Pearson's correlation analyses evaluated the relationship between the 2 questionnaires (VFFQ-23 and VFQ-25) as well as between each questionnaire and VA, CS, and QUS. In patients undergoing LRV, a paired t-test compared pre-operative CS, QUS, VFFQ-23, and VFQ-25 to post-operative measures at 6, 12, 24, and 36 months. In subjects who had bilateral LRV, post-operative evaluations were performed only after both eyes underwent surgery. The differences between the 2 questionnaires with respect to the changes in post-operative findings were evaluated using difference-in-differences calculations.[37]

To evaluate the relative ability of the 2 questionnaires to predict a patient's management choice (OBS vs. LRV), sensitivity, specificity, positive predictive value (PPV), negative predictive value, and accuracy were calculated using standard definitions.[38,39] A receiver operating characteristic (ROC) curve was generated to illustrate the trade-off between sensitivity and specificity of the questionnaire composite scores in distinguishing patients who chose OBS from those electing LRV surgery. Accuracy calculations were used to explore cutoff values of each questionnaire composite score vis à vis the likelihood of surgery. Lastly, to evaluate potential clinical usefulness in identifying patients likely to elect surgery, Decision Curve Analyses (DCA) were performed across a range of clinically relevant threshold probabilities as previously described.[40,41] DCA incorporates the trade-off between true positives and false positives and provides a more comprehensive assessment of net clinical benefit than positive predictive value alone. The analyses included calculation of the VFFQ-23 predictive value using a logistic regression model with a dichotomous outcome (limited refractive vitrectomy vs. observation), as described by Vickers and colleagues.[40,41]

RESULTS

• **SUBJECT DEMOGRAPHICS AND CLINICAL CHARACTERISTICS:** Table 1 presents demographics and clinical characteristics of the study population. Asymptomatic controls were approximately the same age as subjects who elected OBS, and those who underwent LRV, while LRV subjects

TABLE 1. Subject Demographics and Ocular Characteristics.

	Controls (n = 74)	LRV (n = 54 108 Eyes)	OBS (n = 139 278 Eyes)	P LRV vs. OBS
Age (years)	54.6 ± 11.3	60.9 ± 11.8	53.0 ± 16.0	.0001
Sex	39 ♂ 35 ♀	27 ♂ 27 ♀	72 ♂ 67 ♀	.8730
Lens Status	67 / 74 (91%) phakic	60/108 (56%) phakic	253/278 (91%) phakic	.0001
Myopia	22 / 74 (30%)	56/108 (52%) myopic	165 myopic (59%)	.353
PVD Status	29 / 75 (39%) PVD	89 /108 (82%) PVD	161/278 (59%) PVD	.0001

There were no differences between subjects choosing OBS or those electing LRV with respect to gender or myopia (defined as –3 Diopters or more). Subjects choosing OBS were younger, more often phakic, and had a lower prevalence of PVD, confirming previous studies.[22]
PVD – Posterior Vitreous Detachment (determined by ultrasonography).
LRV – limited refractive vitrectomy.
OBS – observation group.

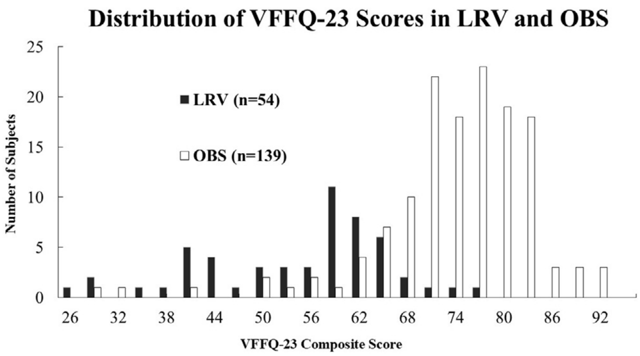

FIGURE 1. Distribution of VFFQ-23 composite scores. VFFQ-23 composite scores in 54 LRV subjects (black bars) were lower than 139 OBS (white bars) subjects, with a wider spread, ranging from a low of 25 to a high of 75. In contrast, OBS subjects had higher scores, clustering between 70 and 85, with relatively few lower scores. Control subjects without floaters had even higher scores, clustering between 80 – 95 (mean = 82.2 ±7.7; data not shown).

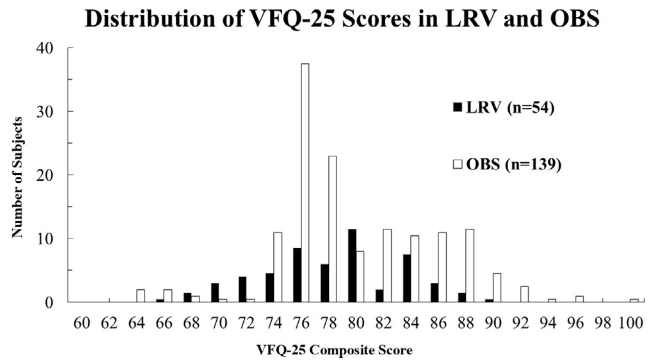

FIGURE 2. Distribution of VFQ-25 composite scores. VFQ-25 composite scores in 54 LRV subjects (black bars; mean = 77.3 ± 5.1) had considerable overlap with 139 OBS subjects (white bars; mean = 79.1 ± 6.0), and CTRL subjects had values between the 2 (mean = 82.8 ± 6.3; data not shown). This suggests that VFQ-25 is not a good discriminatory test in patients with vision degrading myodesopsia from vitreous floaters.

were 15% older than OBS subjects ($P < .0001$). Logistic regression analysis found no differences in gender ($P = .319$) or prevalence of myopia (greater than 3 diopters; $P = .549$). LRV subjects had a 23% higher prevalence of PVD than OBS (Odds Ratio = 2.29, 95% CI: 1.25–4.19, $P = .008$), and a 35% greater prevalence of pseudophakia (Odds Ratio = 6.76, 95% CI: 3.74–12.23, $P < .001$). In pseudophakic subjects, the prevalence of posterior capsulotomy was not statistically significant between the LRV and OBS groups ($P = .129$).

• **CLINICAL TESTING AND PRO MEASURES:** Repeat testing over 2 years after study entry found high test-retest reliability in 48 eyes of 24 OBS subjects: intraclass correlation coefficient for CS was 0.922 (95% CI: 0.875–0.954), for QUS was 0.861 (95% CI: 0.776–0.917), and for VFFQ-23 was 0.863 (95% CI: 0.732–0.936). In the entire study group (including controls), there was no correlation between the 2 questionnaire composite scores ($R = 0.104$; $P = .899$). There was also no correlation between each questionnaire and VA (VFFQ-23: $R = -0.039$ $P = .526$; VFQ-25: $R = -0.012$; $P = .845$). In 74 asymptomatic controls, vitreous echodensity was 17.5% lower than OBS subjects ($P < .0001$), and 54% less than LRV subjects ($P < .0001$). CS was also 29% better in asymptomatic controls than OBS subjects ($P < .0001$) and 54% better than LRV subjects ($P < .0001$). The VFFQ-23 composite scores reflected this, averaging 13% better in asymptomatic controls than OBS subjects ($P < .0001$) and 53% better than LRV subjects ($P < .0001$; Table 2).

VFQ-25 did not correlate with quantitative ultrasonography (QUS) ($R = -0.009$; $P = .884$), nor contrast sensitivity (CS) ($R = 0.065$; $P = .289$), while VFFQ-23 was strongly correlated with QUS ($R = -0.632$; $P < .0001$), and CS ($R = -0.618$; $P < .0001$).

TABLE 2. Clinical Tests and Patient Reported Outcome Measures.

Clinical Test	CTRL ($n = 74$; 148 Eyes)	OBS ($n = 139$; 278 Eyes)	LRV ($n = 54$; 108 Eyes)
Contrast Sensitivity (CS) (% Weber Threshold)*	2.06 ± 0.60	2.89 ± 1.38	4.49 ± 1.49
Quantitative Ultrasonography (QUS, AU)*	566 ± 97	686 ± 176	1237 ± 352
Visual Function Questionnaire (VFQ-25)	82.8 ± 6.3	79.1 ± 6.0	77.3 ± 5.1
Vitreous Floaters Functional Questionnaire (VFFQ-23)	82.2 ± 7.7	73.0 ± 9.9	53.9 ± 11.4

CS, QUS, VFQ-25, and VFFQ-23 were all worse in LRV than OBS and controls ($p < .0001$ for all permutations).
CTRL: asymptomatic controls.
OBS: observation group.
LRV: limited refractive vitrectomy.
*computed using the average of left and right eye measurements in each subject.

Patients electing LRV had 44% greater vitreous echodensity ($P < .0001$), 35% worse CS ($P < .0001$), and 20% worse VFFQ-23 ($P < .0001$) compared to those choosing OBS, confirming previous studies.[22] VFQ-25 composite scores were only 2.3% lower in the LRV group ($P = .0530$) (Table 2).

• **DIAGNOSTIC UTILITY OF QUESTIONNAIRE PROS:** Figure 1 presents the distribution of VFFQ-23 composite scores (dynamic range 26 to 92). Figure 2 illustrates that the distribution of VFQ-25 composite scores had a smaller dynamic range (64 to 100). The mean VFFQ-23 score for the OBS group was 73.0 ± 9.9, whereas the LRV group had a 26.2% lower mean score of 53.9 ± 11.4 ($P < .0001$). VFQ-25 composite scores in the OBS group (mean score = 79.1 ± 6.0) overlapped extensively with the LRV group (mean score = 77.3 ± 5.1; $P = .053$).

The cut-off value that maximized VFFQ-23 accuracy (0.892) was a composite score = 64. With this cutoff, 48/54 (89%) patients who chose LRV were identified. The positive predictive value for surgery was 73.8%, while the predictive value of the VFFQ-23 in choosing OBS was 95.3%.The VFQ-25 cut-off value yielding the highest accuracy (0.736) was a composite score = 72. At this threshold, the positive predictive value was 60%. A receiver operating characteristic curve analysis demonstrated that the superiority of VFFQ-23 (AUC = 0.923), compared to VFQ-25 (AUC = 0.570); see Figure 3.

Figure 4 displays Decision Curve Analysis results. The VFFQ-23 model demonstrated a higher net benefit than both "Treat All" and "Treat None" strategies across a broad range of threshold probabilities.

• **EFFECTS OF LIMITED REFRACTIVE VITRECTOMY (LRV):** After LRV, vitreous echodensity decreased by 62% at 6 months post-operatively ($P < .0001$). This was sustained with 60% reduction at months 12, 24, and 36 post-operatively ($P < .0001$ for each). There was 45% improvement in CS at 6 months following surgery ($P < .0001$), which was maintained at 12 months ($P < .0001$). At 24 months following LRV, there was a 16% worsening from 12 months ($P < .0001$), probably due to cataract formation, since 21 subjects (38.8%) underwent cataract surgery by 24 months post-operatively. At 36 months, CS improved by 11% compared to 24 months, likely due to cataract surgery. Overall, there was 43.9% improvement in CS from baseline to 2.56 ± 1.20% Weber ($P < .0001$).

Compared to pre-op, subjects undergoing LRV had 68.8% improvement in VFFQ-23 composite scores at 6 months, 70.7% at 12 months, 72.5% at 24 months, and 76.3% at 36 months post-operatively ($P < .0001$ for each; Figure 5). In contrast, VFQ-25 only improved after LRV by 7.4% at 6 months, 10.0% at 12 months, 5.8% at 24 months, and 6.5% at 36 months ($P < .0001$ for each; Figure 6).

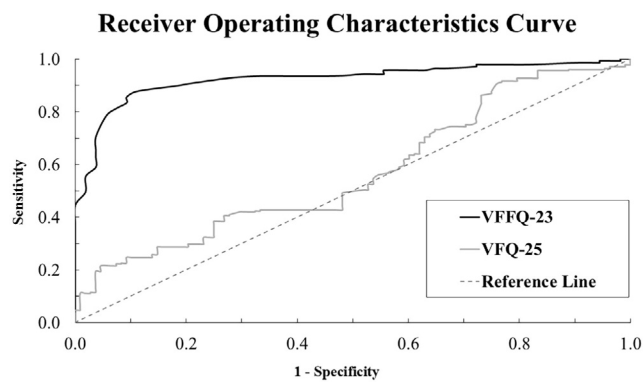

FIGURE 3. Receiver operator characteristics of questionnaires. The ROC curves illustrate that VFFQ-23 (black line) is better than VFQ-25 (gray line) in distinguishing between OBS and LRV cases (controls excluded). The diagonal dashed line represents the reference line (random chance, area under the curve = 0.5). The VFFQ-23 AUC = 0.923 is considerably greater than the VFQ-25 AUC = 0.570.

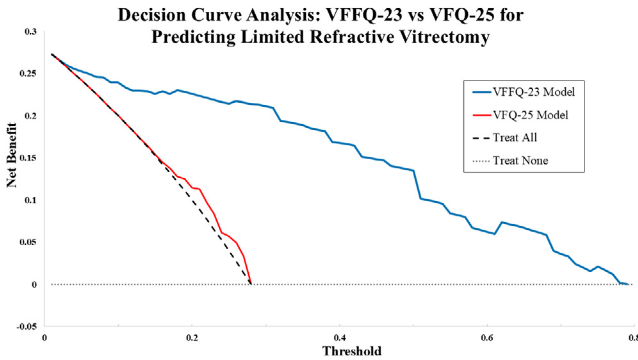

FIGURE 4. Decision curve analysis. The VFFQ-23 model demonstrated a higher net benefit than both "Treat All" and "Treat None" strategies across a broad range of threshold probabilities. In contrast, the VFQ-25 model had minimal added value, remaining only slightly above the "treat all" strategy and approaching zero net benefit at a threshold of 0.28.

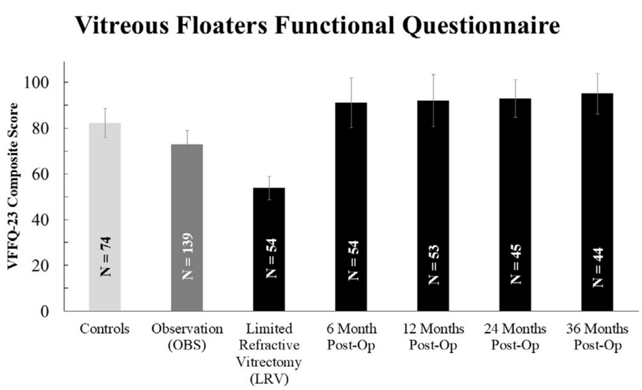

FIGURE 5. VFFQ-23 composite scores in OBS, LRV, and postoperatively. Vitreous Floaters Functional Questionnaire (VFFQ-23) composite scores at study entry were significantly worse for limited refractive vitrectomy (LRV) subjects than subjects who chose observation (OBS), which were in turn worse than asymptomatic controls ($P < .0001$ for each). After LRV, post-operative VFFQ-23 scores at 6, 12, 24, and 36 months showed an average improvement of 72.2. ± 3.2%; composite score = 91.0 at 6 months 92.0 at 12 months, 93.0 at 24 months, and 95.0 at 36 months ($P < .0001$ for each).

Difference-in-differences calculations for changes in pre-op and post-op (average of months 6, 12, 24, and 36) between VFFQ-23 and VFQ-25 found a first difference (changes from pre-op to post-op) of 39.2 ± 11.3 for the VFFQ-23 and only 7.2 ± 5.6 for the VFQ-25. The second difference between the changes in VFFQ-23 and VFQ-25 was 31.9 ± 12.0 ($P < .001$), indicating that compared to baseline (pre-op) levels, the VFFQ-23 improved significantly more than the VFQ-25.

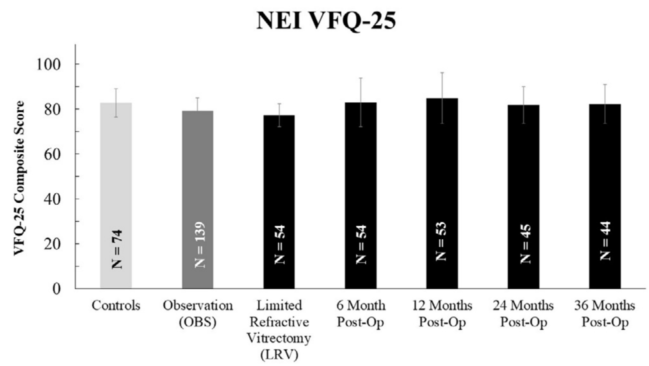

FIGURE 6. VFQ-25 composite score in OBS, LRV, and postoperatively. With the NEI Visual Function Questionnaire (VFQ-25) patients who chose observation (OBS) had only 2.3% better visual quality-of-life scores compared to those who elected limited refractive vitrectomy (LRV) ($P = .0530$). After LRV, VFQ-25 scores showed a slight improvement of 7.3%, increasing to 83.0 at 6 months ($P = .0008$), peaking at 85.0 at 12 months ($P < .0001$) and remaining stable at 82.3 at 36 months ($P < .0001$).

DISCUSSION

During the past 2 decades, the global ophthalmic community has expressed increased interest in vision degrading myodesopsia (VDM) from vitreous floaters.[1-11] Studies using the Web of Science Core Collection to retrieve international scientific publications on vitreous floaters from 1999 to 2023 found a substantial increase in the number of publications and citations.[42] However, in spite of the recognized need for PRO measures in several areas of ophthalmology,[43] there have been no PROs specifically designed for the evaluation of vitreous floaters until the development of the validated VFFQ-23.[22] This questionnaire was designed to be similar to the NEI VFQ-25, by including about 2 dozen questions, each having 4 choices (levels) of response on the Likert scale,[44] with the potential range of composite scores from 0 to 100. The major difference between the 2 questionnaires was that the VFQ-25 queries are about general vision, while the VFFQ-23 has the word "floaters" in each question, as it was designed to specifically query about the impact of floaters on visual quality-of-life (QoL). While previous studies employed the NEI VFQ to assess the impact of floaters on visual QoL,[45,46] that questionnaire was found to have limitations in evaluating vitreous floaters.[47-49] While there are algorithms that improve interpretability of the NEI VFQ,[50] a floater-specific questionnaire has the potential to be more effective.[22]

This study compared the VFFQ-23 to the VFQ-25 in 193 subjects with bilateral floaters who completed both questionnaires on up to 5 separate occasions over the course of 3 years. Only subjects with bilateral floaters were included to avoid variability between patients afflicted in only one eye and those with bilateral involvement. Findings in the 2 eyes of each subject were averaged to properly balance the contribution of each subject to quantitative analysis. Results were analyzed retrospectively to compare those who elected observation (OBS; $n = 139$) to those who elected limited refractive vitrectomy (LRV) surgery ($n = 54$, 108 eyes). Subjects undergoing surgery were studied prospectively to assess LRV effects on vitreous echodensity, contrast sensitivity (CS), and questionnaire findings.

The results showed high test-retest reliability of the VFFQ-23 (as well as the other tests), and strong correlations between VFFQ-23 and vitreous echodensity as well as CS, confirming previous findings.[22] This indicates that VFFQ-23 assessment of the subjective impact of floaters is consistent with objective quantitative metrics. In subjects with floaters, the VFFQ-23 had a larger range (from 26 to 92) than the VFQ-25 (from 66 to 90). The greater dynamic range of the VFFQ-23 allowed it to nearly double the AUC of the VFQ-25, demonstrating greater accuracy in predicting patient management choices. In fact, the VFFQ-23 correctly identified 89% of patients who chose LRV surgery, and had a positive predictive value of 95% in identifying patients choosing observation, while the VFQ-25 was only 60%. Decision Curve Analyses found that in addition to these moderate positive predictive values at fixed cutoff scores, the use of the VFFQ-23 as a screening tool may offer meaningful decision support when integrated into shared clinical decision-making rather than as a stand-alone determinant for surgery. These findings further support the role of the VFFQ-23 in counseling and risk management beyond conventional performance metrics. Furthermore, the greater dynamic range of the VFFQ-23 suggests a greater capacity to measure change with progressive pathology or following therapy. This was borne out in analyses of subjects who underwent LRV, where the average post-operative VFFQ-23 composite scores at 6, 12, 24, and 36 months improved by 72.2 ± 3.2% ($P < .001$), while VFQ-25 only improved 7.4 ± 1.8% ($P < .001$). This indicates that the VFFQ-23 provides a better assessment of patient response to therapy, in this case via LRV surgery.

Limitations of the present study include the exclusion of subjects with unilateral symptoms, and the recruitment of subjects in a tertiary care center that might exclude milder cases and not have diverse ethnic and racial representation. However, the wide range of VFFQ-23 composite scores suggests that this patient population is representative of a broad spectrum of vision degrading myodesopsia from vitreous floaters. Although the VFFQ-23 correctly identified nearly 90% of subjects who chose LRV surgery, the positive predictive value (PPV) was only 74% at a VFFQ-23 cutoff score of 64. This can be improved to 77% with a cutoff score of 62, and 80% with a cutoff score of 60. A variable cutoff based upon the availability of manpower resources has in fact been proposed in the past,[51] and is an approach that might be useful here. However, these findings underscore the need to carefully approach surgical decision-making based upon more than one aspect of patient evaluation. In this case, contrast sensitivity measurements and quantitative ultrasonography along with comprehensive consideration of the risks and benefits of surgery need to be thoroughly discussed.

In conclusion, the VFFQ-23 provides quantitative assessment of the subjective status of patients with vision degrading myodesopsia (VDM) from vitreous floaters that correlates strongly with objective measures of vitreous structure and visual function (contrast sensitivity). Compared to the NEI VFQ-25, the VFFQ-23 more strongly correlates with these objective, quantitative metrics. Thus, this questionnaire may be an efficient clinical assessment to select patients who might most benefit from surgical intervention vs. patients whose symptoms may be more multifactorial. Regarding surgery, the VFFQ-23 was more sensitive to post-operative improvement than the VFQ-25. Thus, VFFQ-23 may be useful in screening/triage, and as an outcome measure of current and future therapies of VDM.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

J. Sebag: Writing – review & editing, Writing – original draft, Supervision, Resources, Project administration, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Justin H. Nguyen:** Writing – review & editing, Validation, Methodology, Investigation, Formal analysis, Data curation. **Kenneth M.P. Yee:** Methodology, Investigation, Formal analysis, Data curation. **Ashley Burchfield:** Methodology, Investigation, Data curation. **Fei Yu:** Writing – review & editing, Validation, Methodology, Formal analysis. **Alfredo A. Sadun:** Writing – review & editing, Validation, Methodology, Conceptualization.

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