

Why "floaters" are a disease and which therapies are promising success.

Visually perceptible vitreous opacities cause the common visual phenomenon known as "floaters".

„Myodesopsia is the less well-known term, although used for many centuries. Dr. J. Sebag, a vitreo-retinal specialist in Huntington Beach (USA), has coined the term Vision Degrading Myodesopsia (VDM) to refer to clinically significant cases of vision impairment. For vitreous opacities and the functional limitations caused by floating structures in the vitreous, particularly following a posterior vitreous detachment (PVD), the term "floater" is far too innocuous, as it is not simply an occasionally bothersome visual experience, but a manifestation disease.

According to Dr Sebag, the commonly held assumption that vitreous opacities are more of a nuisance than a pathological event is also prevalent among many ophthalmologists and has been the case for decades.

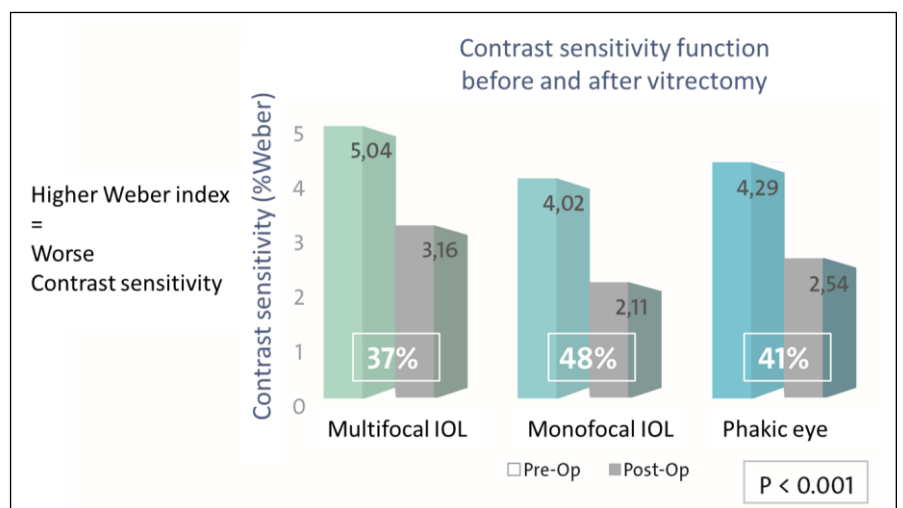
Dr Sebag, a renowned scientist, is considered the world's leading expert in the field of vitreous pathology. He was recently invited to the 35th International Congress of the German Society of Ophthalmic Surgery DOC-2023 in

Nuremberg to give the Meyer-Schwickerath-Lecture as well as speaking during a symposium facilitated by ebiga-VISION, a family-run company from Greifswald (Germany) specializing in evidence-based dietary management of chronic eye diseases.

Based on Dr Sebag's experience, the opacities in the vitreous body can usually be observed very comprehensively with ultrasound, but unfortunately, sonographic instruments have largely been replaced in many practices by optical coherence tomography (OCT). However, Dr Sebag reported that he has

been working with other experts on the adaptation of OCT technology for the visualization of pathological changes in the vitreous.

Thus, it is finally possible to quantify the fibrillar degenerations in vision degrading myodesopsia and the separation of the adjacent structures of vitreous and retina, during PVD. Many patients are likely to appreciate such visual analysis: imaging that could describe how much they are affected by vitreous opacities and provide further justification for seeking help from an ophthalmologist.



Limited vitrectomy improves contrast sensitivity in phakic & pseudophakic (mono- and multifocal) eyes (n = 180)

Graphic based on: Nguyen et al. (2022) Vitrectomy improves contrast sensitivity in multifocal pseudo-phakia with vision degrading myodesopsia, Am J Ophthalmol 244: 196-204

High level of suffering due to visually relevant vitreous opacities

Patient surveys illustrate the loss in quality of life that vitreous changes can cause. A survey of those affected showed a burden of disease equivalent to that of glaucoma and stroke. For successful therapy, those affected would accept a 7% risk of blindness and forego one year of life per decade in order to no longer suffer from floaters.

Many physicians who have so far considered vitreous opacities and floaters as a minor impairment are likely to be convinced of the disease character of myodesopsia through objective clinical indices. The determination of visual acuity is not very meaningful in cases of vitreous opacities. Contrast sensitivity, on the other hand, has been shown to be a more reliable indicator of the individual's visual experience, which is often significantly reduced in these patients. A study with 96 patients, assessed with the FrACT ("Freiburg Acuity Contrast Test") and quantified with the Weber index, contrast sensitivity was 89% worse in a control group with a value of 4.53% compared to a Weber index of 2.40%. With the occurrence of posterior vitreous detachment, this value deteriorates by an average of 52.5%.

Therapy for vision degrading myodesopsia: vitrectomy is promising.

Dr Sebag outlined at the symposium the various treatment options for VDM except for treatment through nutrition, which was discussed in detail by the second speaker of the symposium.



Dr. Jerry Sebag:
"Limited vitrectomy reduces vitreous density and improves contrast sensitivity in all cases even in patients with multifocal IOL."

Dr Sebag was not in favour of the commonly held approach, to convey to the patient that the floaters would "settle", perhaps sink and then no longer interfere with one's vision. He had cared for patients for years and, according to his experience, this simply did not occur – some patients perhaps undergoing neuroadaptation at best.

According to Cochrane and the National Institute for Health & Care Excellence (UK), there is no scientific evidence for the effectiveness of Nd:YAG laser vitreolysis.

According to Dr Sebag's own experience, there is a subgroup of patients (just under a quarter of the cohort) who have benefitted from vitreolysis, but the reasons for this reaction are not known. The only invasive method for VDM that is promising from his point of view, is what he calls limited vitrectomy. It is done sutureless and with 25G instruments.

What is crucial is that a PVD is not surgically induced in patients who have not previously had one and that 3–4 millimeters of retrolental vitreous are retained to avoid cataractogenesis. In 139 of his patients operated on in this way, there was a pronounced and immediate improvement in contrast sensitivity: The average Weber index of 4.5% before the procedure was reduced to 2.4% after only one week. Thus, each one of the 139 patients had normal contrast perception after seven days.

The index continued to decline slightly over the next four years. Depending on the follow-up appointment, an improvement in contrast sensitivity between 47-67% was observed compared to the baseline. Even patients with multifocal intraocular lenses, which are known to lower contrast sensitivity, experienced an average improvement of 37% in their contrast sensitivity. The complications of limited vitrectomy were: spontaneously dissolving vitreous haemorrhage in 1% of cases; retinal breaks in 1.5% of patients; 16% required cataract surgery within one year, but all of them belonged to the older subgroup (over 53 years of age). According to Dr Sebag, limited vitrectomy is a clinically proven and cost-effective method for vision degrading myodesopsia.



Prof. John Nolan:
„I would never ever seen nutrition as a substitute to what ophthalmology does as standard of care. This is complementary.“

Micronutrients protect vitreous bodies from oxidative stress.

Prof. John Nolan from Waterford, Ireland, who heads the Nutrition Research Centre Ireland, spoke about a targeted micronutrient formula for dietary treatment of visually-relevant floaters. The research on this stems from experience with dietary supplementation for age-related macular degeneration.

It has long been known that without an adequate supply of certain nutrients and pigments (e.g. lutein) and antioxidants, the macula is poorly able to protect itself from disease-causing factors such as free radicals and phototoxicity. The vitreous body is not a closed passive system that merely allows light to pass through to the retina. It is rather, as Prof. Nolan emphasized, essential for the functioning of the eye as an optical system and is dependent on adequate nutrients.

The mechanisms leading to the development of vitreous opacities are multifactorial. According to Prof. Nolan, oxidative stress, and glycation, which can change the integrity of collagen fibres, play a significant role. Antioxidants, which also have an effect on the vitreous body, can be divided into enzymatic substances such as glutathione peroxidase and catalase as well as non-enzymatic nutrients. These include vitamins such as riboflavin and ascorbic acid, proteins and free amino acids, and trace elements such as zinc and selenium. The micronutrient formulation VitroCap®N, for which Prof. Nolan presented study results, contains antioxidants, primarily vitamin C, zinc and flavonoids, as well as L-lysine and grape seed extracts, which counteract glycation.

FLIES: Improvement of visual comfort and reduction of vitreous opacities

Prof. Nolan presented the results of FLIES (Floater Intervention Study), in which 30 patients were treated with VitroCap®N and 30 patients received placebo. The median age was 56 years. Approximately a third of the participants were myopic. The visual acuity-dependent quality of life was evaluated

using a questionnaire (Floater Disturbance Questionnaire). The opacities were quantified using wide-angle OCT imaging (Spectralis). After 6 months, the extent of the symptoms described as visual discomfort had decreased significantly in the treated patients and the "discomfort score" had halved, while it had decreased only slightly in the placebo group. The proportion of patients who spoke of a less disturbing, more stable visual experience increased by 33%, while the number of those who felt permanently disturbed by the opacities decreased by 23%. In the control group, where a placebo effect was of course to be expected, 11% reported an improvement. With the administration of micronutrients, the daily living situation improved "very strongly" in 10% and in a "moderate way" in 20%. No effect was reported by 20%.

Objective quantification was achieved by calculating the sum of areas of opacity of 5 images from different angles for each eye. In the group supplemented with VitroCap®N, the areas averaged 121.31 cm² at baseline and 99.78 cm² at 6 months ($p < 0.001$). There was no significant change observed in the placebo group; if anything, there was an observed average increase in that cohort between baseline and 6 months (from 122.55 cm² to 155.07 cm²).

Prof. Nolan summarized the results of FLIES, 76% of those treated with the active intervention showed a reduction in areas of vitreous opacity and approximately two-thirds of supplement users reported an increase in visual comfort.

The most notable outcome was the improvement of contrast sensitivity, which the Irish speaker emphasised as being "a very important result", informed by previous experience in studies with AMD patients.



Dr. med. Thomas Kaercher: "It's surprising that we have so many responders overall (on the micronutrient supplementation, editor's note)."

It is this capacity to detect contrast, that is particularly impacted by age-related changes in the vitreous body. In an aging vitreous, mesopic contrast sensitivity is reduced by 51–91%. Of particular interest then, contrast sensitivity improved by 9% in FLIES in those patients supplemented with VitroCap®N. Prof. Nolan summarized the results of five clinical studies – including FLIES as well as a study carried out by Dr. Kaercher an ophthalmologist in Heidelberg - with more than 600 patients. Overall, success rates so far have ranged between 60% and 80%, largely evaluated by assessing patient experience. FLIES was the first double-blind study in this field..

What has been the experience of ophthalmologists that have been recommending it. In a survey of 95 German and Austrian ophthalmologists whose patients have used VitroCap®N (on average for 4 years), more than 95% of the ophthalmologists rated the dietary supplement as beneficial.

Similar contributions were also shared by the two German experts in the discussion during the symposium. Prof. Ulrich-Christoph Welge-Lüssen (Munich) emphasized that the initial criticism of studies that were exploring treatment with supplementation, claiming that the measurements were not objectifiable, had become obsolete with the documentation of the reduction of the floater area and the improvement of contrast sensitivity.



Prof. Dr. med. Ulrich-Christoph Welge-Lüssen:
„My clinical experience coincides very conclusively with these results (of the FLIES study, editor's note)

When asked by Prof. Hans Hoerauf (Göttingen), who chaired the discussion, whether the administration of VitroCap®N before vitreous surgery was an option, the answer was a resounding yes. He explains in detail the benefits, but also the risks (1-3% retinal detachment) of the operation to patients who are interested in interventional treatment of the floaters. Patients would usually respond enthusiastically to the offer to try VitroCap®N before or instead of the operation. Prof. Hoerauf added that this does not apply for patients whose symptoms are based on acute PVD, but only for those who have been symptomatic for years.



Prof. Dr. med. Hans Hoerauf:
"If you have a chance without side effects, why not take it, e.g. while waiting for the surgical intervention?"

Breakthrough in the understanding of a disease

During his contribution to the discussion, Dr. Thomas Kaercher (Heidelberg) recalled that in 2013 he was one of the first to conduct an observational study on dietary supplementation with VitroCap®N. Following the establishment of his own practice, he became aware of the number of patients who would attend ophthalmologists in private practice complaining of vitreous opacities – This was not the impression he had from his prior experience at eye clinics in Heidelberg and Ludwigshafen; perhaps an indication that those affected by floaters are rarely or not at all referred to a clinic, possibly because in some places the severity of the problem is still not properly assessed. In addition, German university hospitals rarely deal with micronutrients. For these reasons, Dr. Kaercher described it as a "breakthrough" that ophthalmology has become aware of the disease nature of these vitreal changes. In response to a question from Prof. Hoerauf, Dr. Kaercher described his approach to therapy as follows: After three months of treatment with VitroCap®N and depending on the patient's own assessment of their symptoms, there is a break in treatment, which is then followed by a new cycle of supplementation as needed.

Before commencing treatment, it is important for the ophthalmologist/eye care practitioner to examine the retina in detail if a patient has initial complaints about floaters to rule out any other pathology that may require intervention. Even if all is clear, he is not starting immediately the therapy. However, in patients who have long-standing floaters treatment with VitroCap®N can begin after the initial presentation.

The world of ophthalmology – this was a conclusion that could be drawn in Nuremberg – looks at the anterior and posterior sections, but so far not sufficiently at 80% of the eye – the vitreous body.

The complete video recordings of the symposium, separated by lectures and panel discussion, can be found online at:

<https://ebiga-vision.com/en/ebiga-symposium-doc-23/>

