Bringing ‘scatter’ back: enhanced conversions and outcomes

Quantifying forward ocular scatter can help surgeons make better choices for their patients.

Ocular Surgery News U.S. Edition, February 10, 2020
Mitchell A. Jackson, MD

With the new year in full blossom and it being 2020, patients will now be expecting 20/20 vision at the minimum. As premium surgeons, is 20/20 even adequate enough for our patients, and does a quantity of vision really tell the story of patient satisfaction? In reality, quantifying the quality of our patient visual outcomes and eventually enhancing our patient conversions to premium technology in a year of significant financial reductions become paramount. Bringing “scatter” back may be what the doctor needs to start the 2020 year.

Objective scatter index


Mitchell A. Jackson

Ocular scatter in general is defined as localized deviations of light due to a combination of diffraction, reflection and refraction. Forward scattering as measured by the HD Analyzer (Keeler) is ocular scatter as light travels from the front of the eye toward the retina, potentially reducing retinal contrast. Reverse or back scatter as measured by slit lamp evaluation is ocular scatter as it is reflected from the retina, helping in evaluating ocular structures but having little impact on retinal image contrast.

The HD Analyzer provides an optical quality measurement defined as objective scatter index (OSI) by quantifying forward ocular scatter. This OSI number equates to a predicted decimal and/or Snellen visual acuity, which simulates the influence of the patient’s personal scatter score on their quality of vision. OSI is reported in an easy-to-read colored scale that indicates the severity of scatter in a patient’s eye. The green scale gives an OSI score up to 1.5, suggesting a relatively normal scatter pattern; the yellow scale is an OSI score from 2.0 to 4.0, suggesting a dysfunctional lens/early-stage cataract; and a red scale is an OSI score greater than 4.0, suggesting a more severe cataract. Ocular surface, corneal abnormalities such as scars, lenticular changes and/or macular pathology such as epiretinal membranes can affect the overall OSI score, so other testing of the ocular surface, slit lamp and fundus evaluation, and OCT imaging of the macula is critical when interpreting the OSI score. Other devices such as the iTrace (Tracey Technologies) also provide scatter analysis but not a true OSI that is easy to communicate with patients and even insurance companies for the cataract surgery prior authorization process.

OSI and cataract grading

Dysfunctional lens syndrome, as first described by George Waring IV, MD, separates our modern-day cataract grading into three stages. Stage 1 starts around age 40 to 50, when the natural lens loses its ability to accommodate and is typically still clear but with presbyopia in full gear. Stage 2 typically starts around age 50 to 65 with early lens yellowing and increased light scatter with decreased night vision. Stage 3 is true clinically significant cataract. Pablo Artal published how OSI scoring correlates well with the international LOCS III cataract classification and facilitates premium surgeon communication with patients regarding their natural lens changes and the need for surgery when symptomatic. Posterior capsule opacification quantification for YAG capsulotomy necessity is also a benefit with ocular scatter analysis.

Corneal vs. lenticular procedure planning

The most important advantage of OSI is selecting the correct procedure for a patient undergoing a refractive/cataract evaluation for surgery. When OSI scores are in the “green” and all other diagnostic testing is normal, such as the ocular surface, corneal topography, macular OCT and no sign of a cataract on slit lamp

exam, then a laser vision correction procedure should be considered. The problem is with borderline evaluations when everything looks “good to go” on all the usual diagnostic testing but the patient is an early presbyope and has a “yellow” OSI score; then, a lenticular-based procedure may be a better option with a presbyopia-correcting IOL. Personally, I have found OSI technology to be the tiebreaker in many evaluations in determining if a patient should undergo a corneal-based vs. lenticular-based procedure for refractive correction.

Ocular surface benefit

The final benefit of ocular scatter analysis with the HD Analyzer is its ability to quantify the ocular surface in terms of tear film stability and meibomian gland imaging. The latter is similar to imaging obtained with both the LipiView device (Johnson & Johnson Vision) and Oculus Keratograph device. The former is quantitated with a vision breakup time score and collects 40 OSI images over 20 seconds to quantify degradation in visual quality as a result of tear film instability. Roger Zaldivar developed three types of tear film quality patterns to correlate with the vision breakup time and OSI scores: plateau (most stable), seesaw and ladder (most unstable).

In summary, ocular scatter is back, and utilizing technology that can quantify visual quality, lenticular staging and ocular surface stability will help premium surgeons make better choices for their patients and yield better visual outcomes in the end.

Reference:

Artal P, et al. *PLoS One.* 2011;doi:10.1371/journal.pone.0016823.

For more information:

Mitchell A. Jackson, MD, can be reached at Jacksoneye, 300 N. Milwaukee Ave., Suite L, Lake Villa, IL 60046; email: mjlaserdoc@msn.com.

Disclosure: Jackson reports he is a consultant for Keeler, Visiometrics, Johnson & Johnson and Oculus.