

## Focusing the battle against dry AMD

An intraocular lens with an optical design tailored for dry AMD

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**A**ge-related macular degeneration (AMD) is the leading cause of blindness worldwide. Currently, there are no treatments for dry AMD, a debilitating form of the disease in which patients experience slow and progressive loss of visual function and quality of life.<sup>1</sup>

A new class of IOLs (EyeMax Mono) is tailored for patients with dry AMD. By optimising image quality available across the macula, the device maximises the use of a preferred retinal locus (PRL) to improve vision function without the need for visual rehabilitation.

As the world's ageing population continues to grow, global AMD prevalence is also expected to increase. Andreas F. Borkenstein, MD is an ophthalmologist working in Austria. He notes that while several effective therapies are available for his patients with wet AMD, no cure exists for dry AMD and that a 'wait-and-see' approach can be very frustrating for the patient and ophthalmic surgeon.

Dry AMD accounts for approximately 85–90% of all AMD cases.<sup>2</sup> For these patients, the current recommended standard of care is limited to lifestyle changes (e.g., smoking cessation), the use of low-vision magnification aids and undertaking intensive training to use their peripheral vision.

"For many older individuals," says Dr Borkenstein, "a diagnosis of dry AMD is associated with fear that they will spend their sunset years in complete blindness and being entirely dependent on others."

Dry AMD involves the degeneration of the pigmented epithelial layer of the retina. Patients may also have drusen in the macula that can grow in size, shape and change in distribution over time. This ultimately results in patients having gaps in their central vision, which impacts reading and daily activities. It is estimated that at least a quarter of patients requiring cataract surgery will also have intermediate or advanced AMD, presenting the opportunity for targeted IOL implantation in appropriate patients.

However, IOL treatment options currently offered to patients with dry AMD come with caveats. While cataract surgery and standard monofocal IOL implantation has been demonstrated to deliver clinical benefit to patients with AMD,<sup>3</sup> Dr Borkenstein highlights

that a standard monofocal lens is designed to enhance vision at the foveal centre, so provides minimal improvement to vision function in patients with centre-involving dry AMD.

Moreover, Dr Borkenstein explains that surgical implantation of telescopic IOLs is often associated with surgical complications. We have previously observed rises in intraocular pressure, surgical-induced astigmatism, delayed wound healing, endothelial cell loss and challenges in post-operative capsule opacification treatment.

A unique device in the fight against dry AMD is this novel IOL with an optical design tailored for dry AMD. The device is a foldable, injectable, single-piece, soft, hydrophobic, ultraviolet-absorbing, square-edge, acrylic IOL.

"[The device] looks essentially very similar to a standard monofocal IOL," explains Dr Borkenstein. "The difference, however, is that the lens is uniquely shaped to improve image quality in all areas of the macula, up to 10 degrees from the foveal centre (Figure 1).<sup>4</sup> "This is a new concept and pretty amazing."

The IOL allows patients with centre-involving dry AMD to maximise the use of an existing PRL (a natural coping strategy also known as eccentric fixation), or to adapt vision to use a more appropriate PRL that does not include the area of damage. Image blur is reduced and image quality is improved, allowing patients to read words and numbers more easily.

Microperimetric data suggest that, if required, neuro-visual adaptation generally occurs within approximately 4 months of implanting the lens without the need for any training. In principle, the lens should continue to support visual function as dry AMD progresses.<sup>4</sup>

"One of the key benefits to using [the lens] is that it is implanted using simple, well-established techniques that follow the same surgical principles

### IN SHORT

► **Dr Borkenstein discusses a unique device in the fight against dry AMD.**

as insertion of a standard monofocal IOL during cataract surgery,” Dr Borkenstein says.

Lens implantation requires a small 2.4–2.6 mm corneal incision, with the lens folded into an IOL injector system for implantation into the capsular bag. As a result of this, the device can be implanted safely with minimal intra- or post-operative complications. Dr Borkenstein notes that if postoperative capsule opacification were to occur, yttrium aluminium garnet (YAG) capsulotomy could be performed easily as in a standard case.

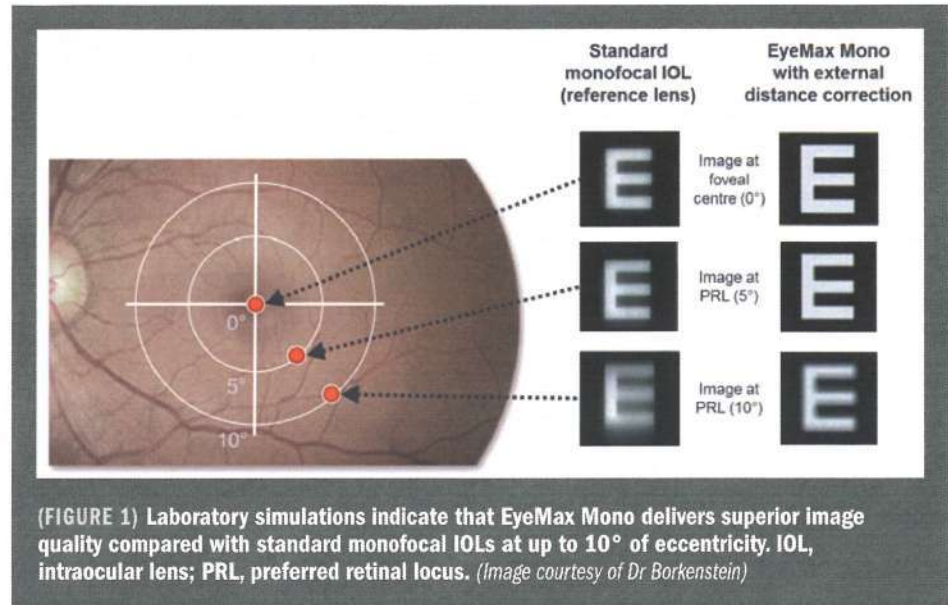
The postoperative target refraction following lens implantation should be between emmetropia and mild hypermetropia (+3 D), depending on patient preference.

“For severe AMD cases, the greatest visual benefit is reported if a hypermetropic refractive target is selected and paired with the aid of post-operative spectacle correction,” Dr Borkenstein adds.

Patients often adapt well to the device following surgery without the need for visual rehabilitation, although Dr Borkenstein advises that particularly older patients can be offered support and assistance to understand the process of neuroadaptation, as this may take them some time.

Dr Borkenstein’s group has recently published a patient case report in *Medicine*,<sup>5</sup> which was also presented at ASCRS 2019, held in San Diego, USA.<sup>6</sup> The patient had stable, dry AMD and progressive cataract in her left eye, and received EyeMax Mono implantation as part of a standard cataract surgery procedure. This was the first implantation undertaken in Austria with the IOL. Results showed that post-operative visual acuity improved over time and was stable from 3 to 12 months after surgery.

These data are supported by results seen in other published work. Lens implantation has been demonstrated to significantly improve visual



(FIGURE 1) Laboratory simulations indicate that EyeMax Mono delivers superior image quality compared with standard monofocal IOLs at up to 10° of eccentricity. IOL, intraocular lens; PRL, preferred retinal locus. (Image courtesy of Dr Borkenstein)

outcomes in patients with dry AMD. A prospective case series in 96 eyes reported a mean CDVA and mean CNVA improvement of 14 and 18 ETDRS letters, respectively.<sup>7</sup> In a consecutive case series of 244 eyes, there was a mean improvement in visual acuity of 18 ETDRS letters.<sup>8</sup> Additionally, a pilot study in 8 eyes from 7 patients reported a 57% increase in mean reading speed (improving from 28±19 to 44±31 words per minute after surgery) and a gain in both mean CDVA and mean CNVA of 18 ETDRS letters at 2 months following surgery.<sup>4</sup>

Dr Borkenstein believes that as well as educating the surgeon on the features of the IOL and the post-operative neuroadaptation process, other key factors for a successful procedure include judicious patient selection and carefully managing patients’ expectations.

“Patients’ expectations are for an improvement to their current quality of life,” he explains. “The most important thing is to be completely honest, and to focus on mutual trust between the patient and doctor rather than setting unrealistic expectations. When selected for the right cases, the IOL is extremely effective. We observed high patient and surgeon

satisfaction in these cases.”

As such, Dr Borkenstein advises that patient-reported outcomes are important to keep in mind. “The ultimate goal of IOL implantation is to enhance patient quality of life and self-autonomy. For example, patients’ ability to perform daily activities independently should be compared before and after implantation,” he explains. “We have tested everyday activities like eating, cooking, pouring tea in a cup, grooming of fingernails and dialling a phone.”

“Overall, I believe [this device] helps to address the unmet needs in dry AMD,” confirms Dr Borkenstein. “Implanted at the right time, and using the right procedures, it is a powerful tool in focusing our battle against dry AMD.”

**OTE** For references go to Europe. [OphthalmologyTimes.com/AMDBattle](http://OphthalmologyTimes.com/AMDBattle)

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