What's Behind that Mirror - Technology to Enhance the Eyewear Patient Purchasing Experience

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Product Spotlight: Spark Mi Up, Sponsored by Shamir Insight Inc.

Accredited for 1 hour of ABO Ophthalmic Level 2

Course Description:

Who do we work for, as ECP's? Answer: The patient. When we do our job right, the result is happy, satisfied patients. To do our job right, what do we want from our lens suppliers? Answer: Reliable precision tools and products that WOW the patient! We want technology in tools and products that impress and make our patients happy that they've come to us and quick to tell others about their experience and satisfaction level; think Five Star rating. In this course, you will learn about a safe, touchless measuring device, a mirror that is also a digital screen, and a camera that takes accurate and precise ***"AS WORN"*** measurements, without physical contact. From the patient perspective, imagine their comfort level when merely looking into a mirror. Now imagine their discomfort level when a marking pen is heading for their eye. Add to this the discomforting proximity of the ECP. Spark Mi Up is a digital mirror tool with the cool hi-tech factor that elevates the patient experience. With the covid-19 crisis looming, this device is timely, but the added safety and precision are timeless. Spark Mi Up makes it easy for the ECP to leave the low-tech marker and ruler in the drawer and embrace the digital technology experience. The bonus for the patient is the opportunity to experience the best lens performance ever. Spark Mi Up is brought to you by Shamir Insight Inc., an acknowledged leader in freeform progressive lens design technology.

Course Objectives:

1. Learn how a touchless no-contact frame/lens measurement technology enhances the patient experience while keeping the patient and the dispenser safe
2. Learn about the impact of providing the lab with precise and accurate ***As Worn*** measurements to compensate and optimize freeform digital lens design
3. Learn about using technology *to sell* technologically advanced lenses. Lose the low-tech marking pen and adopt touchless, digital technology for measuring frame geometry and lens parameters.
4. Learn about Shamir Spark Mi Up mirror technology for fast, convenient, precise, accurate, and safe measurements.

Using Tech to Enhance the Patient Experience

Creating a 5-star (Fig. 1)experience in the digital age means incorporating digital technology into the patient's eyewear purchase experience. Your patients have become accustomed to using digital technology for online shopping, and they will welcome digital technology lens solutions as well as digital tools for acquiring frame geometry, frame fit, and lens centration parameters. Furthermore, using digital technology improves in-person interactions by making the experience seamless, quick, and comfortable. Remember that shares, likes, ratings and reviews inform consumers more and more in the digital age, making it imperative that we make their visit memorable and shareable. I am much more likely to tell my friends about this new digital screen that's a mirror for measuring me for glasses than I ever would mention a magic sharpie and a ruler. In the age of covid-19, safety is a key aspect of the new patient experience, and Spark Mi Up is a tool for gathering essential lens and frame As-Worn metrics and bonus it's fast, comfortable, and safe.

Figure 1

Use Hi-Tech tools to Sell Hi-Tech Lenses

Think about the impression you are making with your patient. Is the practice current and relevant or behind the times? Shame on us if we are selling the patient a hi-technology digital freeform lens design while still using a pen and ruler to take their measurements. See the interaction from their perspective. Which process says that your practice is 'current and up to date' 1. Invading the patients' personal and safe space while aiming felt tip marker at their pupil. UNCOMFORTABLE! Or option 2. Extrapolating **As Worn** measurements using digital cameras and software that only requires the patient to look into a mirror? Freeform lenses have digitalized and advanced lens design, surfacing, and finishing. Today we produce far superior lenses due to the ability of these hi-technology lenses to optimize the design and compensate the lens for reducing or eliminating optical power errors and oblique astigmatism. Use technology to sell technology; it's a Win, Win!

Figures 2 and 3

Which of these scenarios makes a positive impression on the patient and conveys hi-technology?

Perfect Vision with a Personal Touch

The goal is always to provide your patient with optimal vision through their lenses. Personalized Digital lens design and surfacing technology are advancing and becoming more responsive to more and more customizable parameters. Prescriptions are written based on zero tilts/angles since the trial lenses used in the refraction are flat in front of the patient's eye during the exam. Yet we know that the frames the patients will ultimately wear have pantoscopic tilt, typically around the horizontal axis and positive face form or wrap angle around the vertical axis and likely sit closer or further from the eye than the prescription refractive distance. As ECP's, we need easy, non-intrusive tools to obtain the precision **As-Worn** measurements that, through digital freeform compensation of the lens surface, will result in optimal vision. Understand that how the frame fits relative to the patient's biometrics affects the lens optical performance. Once you know the effects of **As-Worn** measurements on lens performance, you will realize the importance of providing these invaluable measurements accurately. Lucky for us (and the patient), digital freeform lens technology can compensate the lens for the ***As-Worn*** metrics and optimize the lens design for the best lens performance. Until Spark Mi Up, it was a challenge for most ECP's to provide these metrics.

What are "**As-Worn"** measurements, and how do they affect lens optics?

1. The **Pantoscopic Tilt** of the frame worn is the angle formed by the tilt of the lens around the horizontal axis. Typically, the tilt angle around the horizontal axis is pantoscopic, meaning the bottom of the lens tilts in toward the cheeks. Although undesirable cosmetically, retroscopic tilts are when the bottom of the frame front sits further from the face than the top of the lens, and no tilt is referred to as orthoscopic. The optical effect of a pantoscopic tilt is to increase spherical power and induce a cylinder on the 180.

2. **Panoramic,** aka **Wrap Angle** of the frame, is the degree of the angle formed from the center of the bridge to where the outer edge of the lens and frame join. It is a frame measurement, not an as worn measurement; however, it impacts the as worn optics by moving the optical axis of the lens relative to the line of sight, aka visual axis. The important angle is the one formed between the tilt of the optical axis of the lens relative to the eye's visual axis in the primary position (straight ahead view). The tilt of the optical axis of a frame is influenced by the base curve, decentration frame wrap angle, and prescribed prism. If a patient's pupillary distance is more narrow than the frame geometric center distance, then the line of sight or visual axis will cross the OC of a lens obliquely if the face form or wrap angle is is zero. **Face form: Defined as lens tilt around the vertical or y-axis, with respect to the primary gaze angle.**

3. **Vertex Distance,** aka Back Vertex Distance (BVD) of the frame as worn – the distance from the back of the lens to the corneal apex. How does BVD affect lens optics? It's simple; if a minus lens moves further from the eye, the minus power experienced is weaker, and the opposite is true, move a minus lens closer, and the minus power experienced is stronger. The reverse is true for plus power lenses.

If you move any lens away from the eye it gains plus so a minus loses power and a plus gains power.

If you move any lens towards the eye it gain minus so a minus gains power and a plus loses power.

Refraction Vertex Distance is a measurement that Shamir can use to affect the lens design if the dispenser has obtained this information from the refracting Doctor. Why is this important? Because it is the distance at which the Doctor measured the prescription power needed. If the frame of the finished eyewear sits closer or further away than the refracted vertex distance, then the power in the lens of the finished eyewear will be different from the power prescribed.

Example: Patient Rx = -8.00sph with a +2.00 add power examined vertex distance = 12mm

The frame chosen has a 16mm vertex distance from the back of the lens to the patient's corneal apex. The frame vertex distance is 4mm further away than the refracted vertex distance. In a minus lens that's moved further away from the eye, the minus power experienced will be weaker. Let's see how much weaker, using the formula ((D2/1000)*4) so, 8 squared is 64, divided by 1000 is 0.0064, then multiplied by 4 = 0.256 D and since minus lenses are weaker when moved away from the eye, the lens will be weaker by this amount if not compensated. (-8.00 -0.25 = -7.75 D). The effective power becomes -7.75D or 0.25D weaker (rounded). This small change for the distance power may be within tolerance due to the high lens power for the distance Rx but what happens to the reading power? The reading power is now weaker by a quarter diopter. Our goal is to provide optimal vision in eyewear, but we can only accomplish this if we reproduce the Rx as it is written. Using freeform lens design, we can compensate for the lens's effective power to produce the intended power. Again the emphasis is on providing the lab with precise ***As-Worn*** metrics to use in the compensation and optimization of freeform lens design. In a perfect world scenario, the refracted distance and the frame vertex distance are the same, but this rarely occurs. By compensating the power produced by the <u>difference</u> in vertex distances, the patient receives the power the Rx intends. This is your first example of the importance of providing accurate As-Worn parameters to the lab so that they can accurately compensate for the lens difference in vertex from refracted value to As-Worn value.

Changing the distance a lens sits from the corneal apex of the eye *or* changing the angle of a lens in front of the patient's visual axis, from that of the flat trial lens used in the refraction, introduces power error, unwanted cylinder power, and oblique astigmatism. Lens power errors and aberrations lower the lens optical performance by reducing acuity and useable clear fields of view. The further the eye rotates away from the lens optical center, the greater the oblique aberration.

Whether from an off-axis gaze angle or lens tilt angle relative to the line of sight, a significant angle is formed between the lens optical axis and the patient's line of sight. Freeform design can optimize the lens surface to minimize unwanted astigmatism, and power errors if the As-Worn pantoscopic tilt and wrap angle measurements are provided.

Freeform design optimizations can minimize or eliminate oblique astigmatism *and* power error when the actual **As-Worn** parameters are provided. Minimizing *o*r eliminating these primary lens aberrations is key to improving lens optical performance.

Oblique Astigmatism and Power Error:

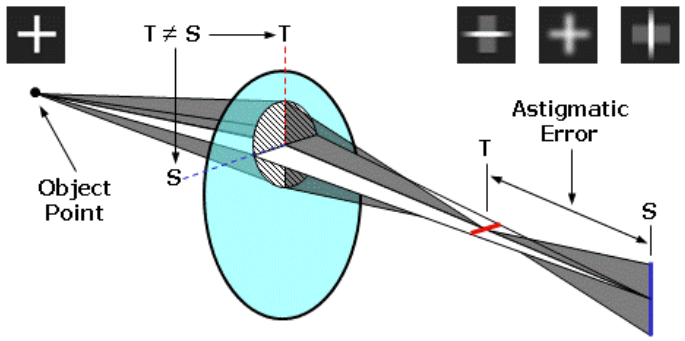

Figure 4 Oblique refraction produces an astigmatic error – Image courtesy of 2020 Magazine

Off-axis refraction produces two focal lines (as illustrated in Figure 4) rather than a single focal point. This produces oblique astigmatism. Oblique astigmatism is a power error equal to the *average* difference in dioptric power between the two astigmatic focal lines and relative to the desired focal point of the lens.

Astigmatic error = (Tangential error – Sagital error)

Power Error = (Tangential Error + Sagittal Error) ÷ 2

For example, consider the tangential and sagittal power produced at a distance away from the optical center of the lens (Fig.1): a +10.00 D lens power that produces +12.00 D power in the tangential meridian and +12.50 D power in the sagittal meridian.

Astigmatic error = +2.00 – 1.50 = 0.50 D

Power error = (2.00 +1.50) / 2 = 1.75 D

The key to As-Worn measurements is precision and accuracy.

Shamir Spark Mi Up Mirror Technology

Spark Mi Up is a smart, compact, intuitive, and user-friendly device designed for fast and easy ECP and Patient interface to produce accurate **As-Worn** lens measurements. It is a *plug and play* turn-key setup that includes a screen that looks like a mirror that is attached to an adjustable arm and connected to a laptop with a long USB cable. Synchronization between two cameras yields a high-resolution 3-D image. A click captures the image, and the patient can relax. The ECP can further refine the alignment of the marked points before calculating the final metrics. Accurate **As-Worn** measurements are an essential design parameter used to compensate and optimize the lens surface design. These are personalization parameters specific to the patient and the fit of the frame. Digital lens design and surfacing technology make customization, optimization, and compensation possible. These **As-Worn** parameters become part of the freeform design algorithm that computes the requisite lens surface over thousands of points to produce optimal vision specific to the patient. The lens surface design is applied precisely by the multi-axes freeform CNC generators. I said it once, and I will repeat it; precision is the key! As lens technology

advances, As-Worn frame fit metrics become vital in our goal to provide every patient with optimal vision.

Spark Mi Up features: fast, precise, hygienic, and convenient measurements

Spark Mi Up benefits:

- Protection for both the patient and ECP - Hygienic
- Leave a hi-tech impression
- Maximizes patient comfort in an often unwieldy eyewear purchase and fit process
- Be 'share' worthy give your patients an experience that they want to talk about
- Precision = Optimal vision in their new eyewear

Fast: What's behind that mirror? Spark Mi Up is so much more than a mirror; it is a new touchless device that allows ECPs to take all **As-Worn Quadro** measurements in about **60 seconds.**

Hi-tech: It is a 3-D measurement tool where the cameras take images from which the software program extrapolates precise and accurate **As-Worn** measurements.

Hygienic: The device is touchless, requiring no physical contact between the optician and patient, keeping the ECP and the patient safe. Hygienic practices are front-of-mind amid the covid-19 pandemic, and I suspect they will have a long-lasting effect on our approach to exams and other activities like taking As-Worn measurements for the making of eyewear. A measuring system in which no instruments or devices touch the patient and promote safe distancing between the ECP and the patient means to a safe experience for all.


Figure 5

Convenient and Comfortable Patient Experience: From the patient's perspective, it is as simple as looking into the mirror. (Fig. 5)The patient puts on the selected frame and assumes a natural posture. The optician positions the mirror using its adjustable arm to center the reflection of the patient's face in the mirror. The device's pupil detection accounts for how the patient wears the glasses. With one click, the optician takes the picture, and the patient is done. Advanced image filters can capture pupils even through dark lenses and some mirrors. Measurement for sunglasses is now just as quick, easy, and accurate as for clear lenses. The image appears on the computer screen, along with immediate and accurate, automatically measured far PDs. There are no marking pens, rulers, gadgets, or other devices needed, and no direct optician-patient contact. The practitioner can finish the process immediately or save it and see the next patient.

Using Spark Mi Up

The ECP marks ten points on the saved image. The computer uses an advanced algorithm to compute the patients' as-worn measurements and frame dimensions, including the patients monocular PD, fitting height (FH), frame dimensions (A, B, ED), the distance between lenses (DBL), back vertex distance (BVD), panoramic angle (wrap angle/face form) and pantoscopic tilt are all computed by the computer. Spark Mi Up is fast; this all happens in about 60 seconds. With these measurements, the lens design is optimized for best centration, minimized oblique aberrations, and compensated for delivering the lens power as intended with the Rx. The result is optimal vision and wide fields of view. The unit will also display alerts so the optician can make necessary changes to the order. The information is saved as a PDF and can be used to place the order with the lab.

The process is not only accurate but safe, hygienic, and timely in our new healthcare conscious environment. Think about our proximity to patients when we measure PDs with a pupilometer. Not to mention the pupillometer is touching the patient's face, and so it must be sanitized since it is a potential surface for germs. Eliminating the need for direct contact allows for appropriate distancing between the patient, the optician, and the measuring tool. The mirror is positioned at least 15 to 35 inches from the patient's face, and there's an extra-long USB cable to allow for full functionality at a distance. Clear partitions can be installed between the patient and optician without sacrificing measurement accuracy. Taking measurements with a single click reduces the time patients need to spend in the dispensary, limiting exposure for the patient and staff.

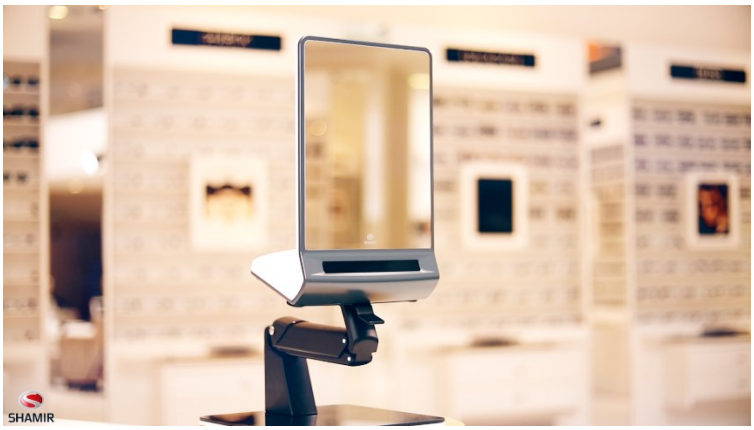

Figure 6

Spark Mi Up comes with a cleaning cloth and spray and can be cleaned with disinfectant wipes as well. With a high-end gloss finish and design requiring little space, it is an attractive addition to any optical shop. You can now offer patients a comfortable, safe, and hi-tech experience while saving time and guaranteeing precision and accuracy.

Learn from the wise words of Raanan Naftalovich**,** President, Shamir Insight, states, "The continual advancement of specialized solutions will require enhanced patient information. Utilizing advanced measuring devices such as the Spark Mi Up will be expected as customized freeform lenses become more the norm. Shamir has already seen the incorporation of as-worn measurements into lens designs, and as technology develops, we will see the opportunity to specialize designs based on additional parameters." Shamir's joint mission: Perfect vision. Personal touch.

Remember, we want hi-tech products and tools to WOW our customers. We want them to tell their friends and family about their great experience, and we want them to return. Shamir is a company known for the development of proprietary technologies, servicing, and supporting independent optical shops with a wide range of optical solutions and education; Spark Mi Up is the latest Shamir advanced

measuring tool to assist ECPs and enhance the patient experience. Our dedication, as ECPs, is to provide the most technologically advanced personal experience to each patient. Spark Mi Up is a tool that delivers on that promise.