

What Every Practice Must Know About Freeform Lens Surfacing

Freeform surfacing is about to revolutionize the eyewear industry. Here's what practices need to know in order to take the best this technology has to offer while avoiding potentially costly missteps.

The optical industry is poised for significant change thanks to the introduction of freeform surfacing to the lens manufacturing process. Lens innovations facilitated by this manufacturing breakthrough are already coming to market. One such example is Varilux® Ipseo™, a progressive addition lens (PAL) that is customized to suit each wearer's physiological viewing habits. Additional innovations are in the pipeline.

The transition to freeform technology will be a watershed in the history

of eyewear, much like the transition from bifocals to PALs was a generation ago. Advances made possible by freeform surfacing will create opportunities for dispensing practices and their patients. Practices will want to learn about freeform surfacing now so as to position themselves to take maximum advantage of a technology that will improve patients' vision and bring a new generation of premium products to market that will improve dispensary profits.

TRADITIONAL VS FREEFORM SURFACING

Traditional lens-making tools have either spherical or cylindrical surfaces and can work only on the backside of the lens. They cannot create aspheric shapes or the complex curves required for PAL designs. This is why the progressive channel of PAL designs has traditionally been pre-molded by the manufacturer on the front surface of the lens.

Freeform, or direct, surfacing makes it possible to grind the front, back, or both sides of a lens blank as needed to produce sophisticated lens designs. A computer numerically controlled (CNC) freeform generator creates the lens surface according to the desired parameters, which may include optics-influencing variables beyond the usual sphere, cylinder, and axis of the prescription (Figure 1). The lens



FIGURE 2 The complex surface of a freeform-generated lens requires special computer-controlled polishing to ensure the integrity of the surface is maintained.

is then polished, using a computer-controlled "soft sponge" system to ensure optimal clarity is achieved while maintaining the integrity of the surface curves (Figure 2).

In theory, with freeform generation any curve that can be mathematically described can be generated. What is important in practical terms is that freeform generation allows any optically useful design to be created in a spectacle lens. Where manufacturing technology was once the limiting factor in optical design, that barrier has been removed. It is now possible and affordable to offer each patient an optically advanced (even a unique) solution to his or her visual needs (Figure 3).

FREEFORM TECHNOLOGY ALLOWS ADVANCES IN LENS DESIGN

Thus, freeform technology allows manufacturers to take single-vision and multifocal lens designs to higher levels of optical sophistication. To date, the focus has been on the de-



FIGURE 1 Freeform generators produce complex lens surfaces, such as those required for patient-customized progressive lenses.

velopment of optimized PALs. This is because freeform technology offers more benefits to more complex designs like PALs than to inherently simpler single-vision lenses.

There are several ways that freeform technology is currently being adapted to produce next-generation PAL designs:

1. *Fine-tuning a semi-finished lens blank that has a pre-molded front*

surface progressive design. The backside can then be ground with complex freeform curves that will adapt the lens precisely to the visual needs of the patient. (In traditional surfacing, standardized curves would be used for the back surface. This, of necessity, means some compromise in optical design. Freeform technology allows use of optimal back surface curves rather

than good approximations.)

2. *Adding new prescription parameters.* This is the approach of Varilux Ipseo, which is the first progressive lens to incorporate the patient's visual habits into the lens design in order to produce a progressive surface that is uniquely suited to that individual's prescription and viewing behaviors. The two data

DISPENSING IN PRACTICE OPTICAL SERVICES DEPT, KENMORE PRACTICE, HARVARD VANGUARD MEDICAL ASSOCIATES, Boston, MA

Harvard Vanguard Medical Associates is a nonprofit, multi-specialty medical practice with several locations in the Boston area. Its Kenmore office includes an ophthalmology/optometry practice with an adjoining optical service center that is run by four licensed opticians.

The practice achieves its goals for dispensary growth by focusing on increasing the capture rate and by delivering customer service experiences that stimulate patient referrals.

CHANGING COUNTER-PRODUCTIVE HABITS INCREASES CAPTURE RATE

The practice strives to increase its capture rate by paying attention to habits that discourage patients from visiting the dispensary. Two well meaning but counterproductive habits common in ophthalmic dispensing are: 1) telling patients who have little or no prescription change that they don't need new eyeglasses, and 2) counseling emerging presbyopes who require add powers of +2.00 D or less to pick up a pair of readers from the drugstore.

In the latter case, patients are effectively left to select their own lens power. This has several downsides, including loss of revenue for the practice. "Drugstore" eyeglasses don't correct cylinder, take the individual's pupillary distance measurements into account, or allow clear vision at all distances (as would a multifocal lens), so a degree of visual compromise is involved. Patient access to fashionable frames, lightweight lens materials, and useful lens treatments, such as antireflective coating, is compromised, too.

Also, these patients won't learn about premium options like progressive lenses that will allow them to see naturally at all distances. Progressive lenses are a great convenience, even for patients with mild corrections, because patients won't need to continuously take their eyeglasses on and off—or peer over their eyewear—to see objects at a distance.

DON'T DENY THE OPPORTUNITY TO UPGRADE

It is also counterproductive to tell patients they don't need new eyeglasses

because their prescription hasn't changed. This encourages patients to stay in frames and lenses that may be showing signs of wear or that don't take advantage of the latest optical technologies and fashions. (And, for patients who have their eyes checked about once every 2 years, eyeglasses that are 2-years-old now will be at least 4 years old by the time of the patient's next exam.)

Patients are better served when, at each visit, they are invited by the doctor to visit the optical shop in order to learn about new frame and lens options suited to their current lifestyle needs. Once educated by the optician, patients can make a fully informed decision about the merits of investing in a new pair of eyeglasses.

TRUST IS THE BASIS OF SUCCESS

The practice also boosts its capture and referral rates by focusing on customer service. This means winning patients' trust through word, deed, and appearance. For example, the opticians wear fashionable, professional attire and eyewear.

This assures patients that the team has the fashion savvy to help them select appearance-enhancing eyewear. Establishing trust through words requires patience: taking the time to listen to patients' needs and then fully educating them about the premium lens features that can best address their needs.

The practice recently received a letter that underscores how important customer service is to the dispensary's long-term success. The patient wrote, "I've been coming to the optical shop for over a decade, mainly because of the high quality of service.... Not only are they [the opticians] knowledgeable and patient, but they genuinely care that their clients are fully satisfied with both the prescription and the aesthetics of the eyeglasses they purchase." Each day, in each patient encounter, the practice strives to inspire this same level of confidence and satisfaction.

VariluxMD thanks optical supervisor Bobin Nicholson of Harvard Vanguard Medical Associates' Optical Services Department, who was interviewed for this article.

points that are used to factor the patient's visual habits into the design of the Varilux Ipseo lens are the head/eye movement ratio (H/E ratio) and the stability coefficient. An instrument called the VisionPrint System™ measures

means to an end. Freeform surfacing cannot improve optical design. Using freeform technology to generate a mediocre lens design will result in an accurate but still mediocre lens. In the end, a lens is only as good as the lens design on which it is based. This, in turn, reflects the quality of the research and development team that created the design. Thus, freeform technology is only valuable when it's paired with excellent lens design. This is the combination that will revolutionize eyewear in the coming years.

As the US market-leading provider of premium lens designs, Essilor of America, Inc. is in strong position to leverage the research, design, and manufacturing capabilities needed to deliver next-generation lenses that truly enhance patients' vision, comfort, and quality of life.

GLOSSARY

Surfacing: The process by which a patient's final correction is ground into a semi-finished lens blank

Semi-finished blank: A lens blank that is shipped from the manufacturer finished on the front side. The patient's prescription is ground onto the back by an optical laboratory.

how the patient moves his head and eyes when shifting his gaze from straight ahead to the periphery. This data, in conjunction with the standard prescription, is used to make a progressive lens optimized for the way the patient uses his eyes.

3. **Making adjustments for the frame and its wearing position.** Varilux Ipseo can be further customized by selecting one of three available progression lengths based on the selected frame shape.

LENS DESIGN MAKES THE DIFFERENCE

It is important to remember that freeform surfacing is a technology, a

WHAT WILL CUSTOMIZATION MEAN?

The advent of freeform technology will mean many things. For example, customization to the individual patient will become possible. (*Caveat:* while freeform makes wearer-customized lenses possible, "customization" and "freeform" are *not* the same thing. Freeform surfacing can be used to produce standard designs as well.)

Customization to physiologic variables, as made possible by Varilux Ipseo, should further reduce the adaptation period patients typically experience with PALs. With Ipseo the lens design is adjusted to the patient

IN THE NEWS

PhysioTints™: A New Breed of Prescription Polycarbonate Sun Lens

Using a revolutionary process that tints the lens itself (and not just the lens coating), Essilor has created a tinted polycarbonate lens that will not crack, fade, or peel. Available in brown, gray, gray-green, and black (tint grades 0-3), new PhysioTints™ also provide prescription sun lens wearers with truer, more natural color perception and 100% UVA/UVB protection. PhysioTints are compatible with Crizal® Alizé, the superior antireflective technology.

instead of requiring the patient to adjust to the lens.

Freeform generation can also be used to create lenses that eliminate various forms of aberration. For ex-



FIGURE 3 A finished Varilux® Ipseo™ progressive lens, complete with the markings necessary to block the lens for edging to the frame shape.

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Although advances in lens manufacturing, like freeform surfacing, may at first seem far removed

from the day-to-day activities of the dispensary, industry innovations directly impact

our operations. Improved lens processing technologies can speed turnaround times and make it possible to offer our patients lens designs of ever greater optical sophistication. Current advances in lens design and processing technology are bringing us exciting new ways to customize patients'

eyewear. It pays to understand how this emerging industry trend will affect our patients and our business. After all, it is by being knowledge leaders in our many fields of endeavor that ophthalmologists remain successful in today's competitive environment. ■

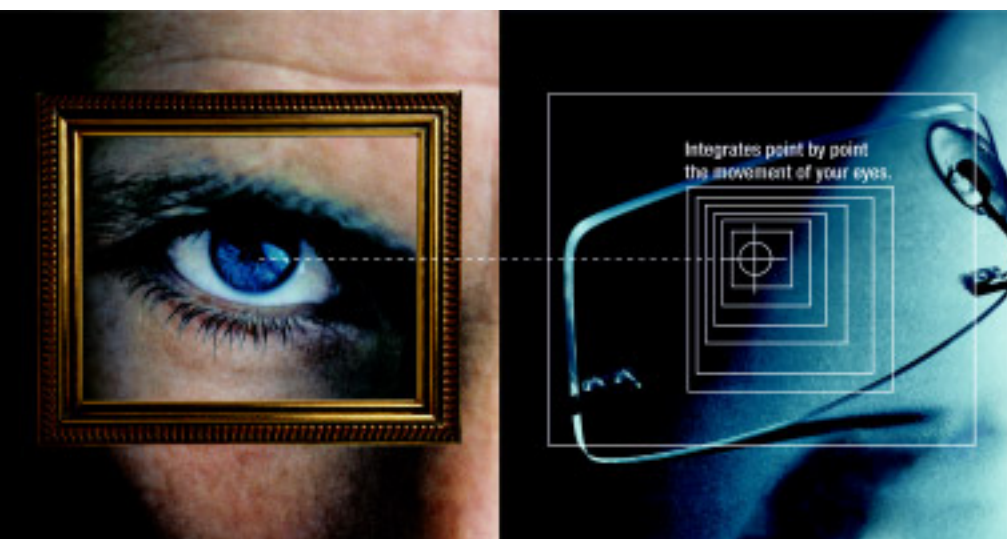
ample, aspheric surfaces can be generated to eliminate spherical aberration from the lens.

KNOWLEDGE SHARPENS THE PRACTICE'S COMPETITIVE EDGE

Ophthalmologists' dispensaries are typically the high-end of the market and a significant portion of the patients they serve are presbyopes, the consumer group that will reap the benefits of the first wave of new-generation lens products. The ability to knowledgeably evaluate new product offerings—to look beyond the buzz words to the sub-

stance of a lens's design and performance—will help ensure the practice helps its patients to the best available optical technology.

In any business the market leaders are those who adapt to change and who embrace novel technologies that open up new possibilities for their customers and their businesses. By providing patients with more highly customized eyewear, the practice distinguishes itself in the market place. In addition, high-end, high-technology products offer profit margins for the practice that are commensurate with the added value patients receive. ■



EACH PATIENT'S VISION IS UNIQUE. SO ARE VARILUX® IPSEO™ PROGRESSIVE LENSES.

For the first time ever, thanks to the VisionPrint System™, your patient's head and eye movements are recorded and integrated point by point into the design of their lenses. Tailor made, Varilux Ipeo lenses are so unique, they adapt to the wearer and not the opposite.

Core Concepts

- **MDs**
 - 1 Freeform surfacing makes it possible to produce highly sophisticated lens designs
 - 2 Lens performance is determined by the quality of research and design behind it
 - 3 Understanding industry trends enables practitioners to make informed decisions on patients' behalf
- **OPTICIANS**
 - 1 Freeform surfacing is ushering in a new-generation of lens designs
 - 2 Varilux Ipeo is the first PAL customizable to patients' viewing habits
 - 3 Personalized lenses are part of personalized service

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