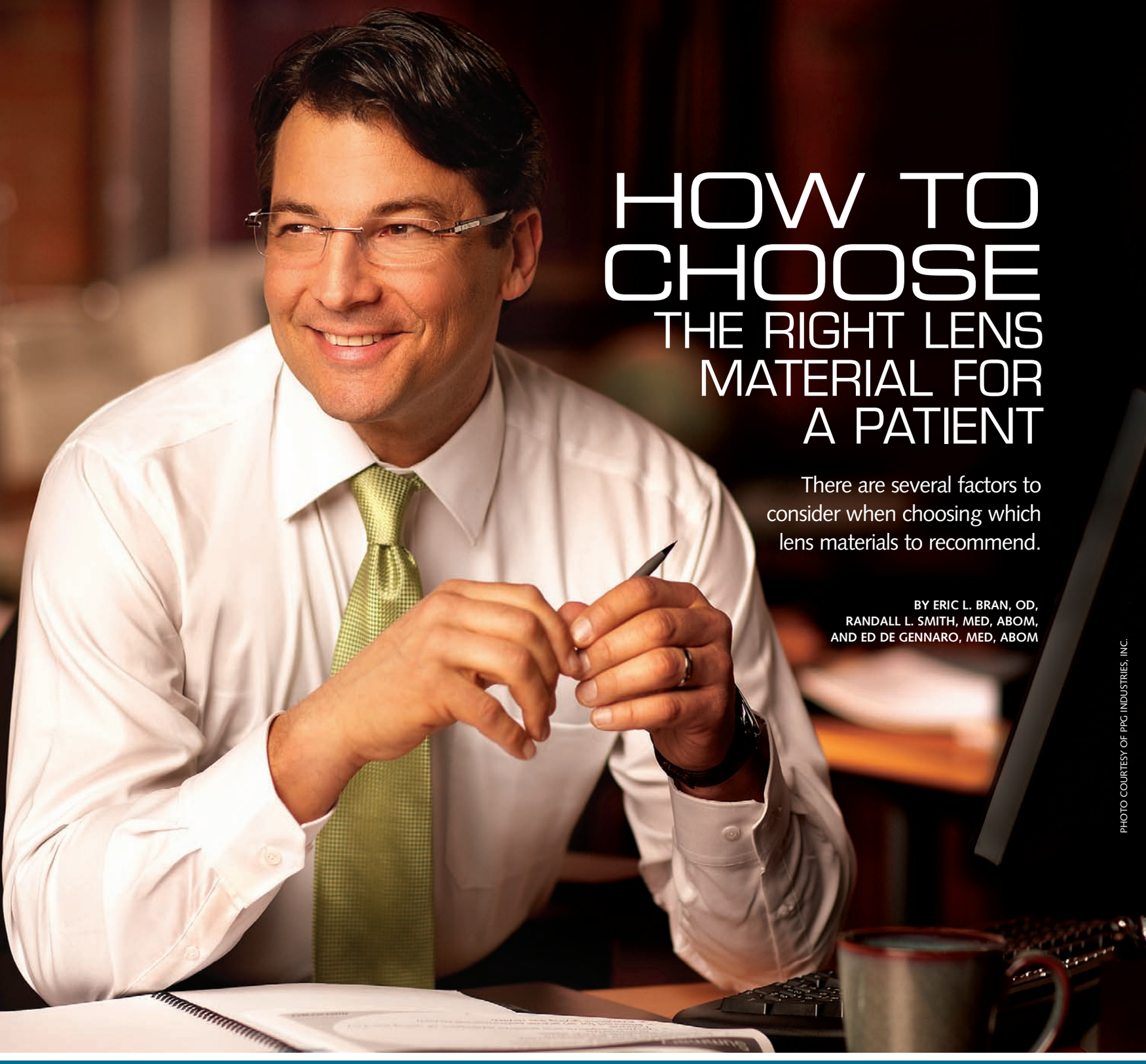

HOW TO CHOOSE THE RIGHT LENS MATERIAL FOR A PATIENT

There are several factors to consider when choosing which lens materials to recommend.

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COURSE DESCRIPTION

Choosing a lens material for a patient is arguably one of the most important recommendations an eyecare professional (ECP) makes during the eyewear selection process. Today's ECP can choose from plastic lens materials in 11 indices, ranging from 1.50 to 1.74, and in five indices from 1.52 to 1.90 in glass. Which one is the right one for your patient and how do you decide? This course will explore aspects of lenses you should consider and recommend how to make the right decision in order to provide the appropriate lens material for any patient.

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If you were an optician in the 1960s, you remember that choosing a lens material was a pretty simple task. You almost always recommended a lens made of Crown glass. Occasionally, you would use a high-density flint glass that had a high-index of refraction. Today, there are a wide variety of plastic lens materials on the market along with a few glass choices, all with specific features, benefits, and applications. The question is: which one is the right one for any given patient and how do you decide which one to use?

GETTING STARTED

In order to decide which lens material to use for a patient, you should establish criteria for selecting it. These criteria should be both objective (based on reviewing measurements and data, and observing physical conditions) and subjective (based on answers that patients give to questions—their opinion of what they need or want).

BY THE NUMBERS

Before you ask the patient any questions, gather some objective preliminary information on your own by looking at the patient's Rx. What power is used in each eye? In many cases, it will fall between +/-3.00D. In a study conducted by Younger Optics this year, it was discovered that 85% of all prescriptions fall into this category. According to the study, 92% of all prescriptions fall between +/-4.00D while 95% fall between +/-5.00D. At +6.00D to -6.00D, you'll cover 97% of prescriptions. The Rx's that fall above +/-6.00D constitute only 3% of all Rx's dispensed.

What is this objective Rx data telling you? While it may be surprising to learn that the vast majority of prescriptions fall between +/-3.00D, it is an important statistic because it means that most patients do not require high-index lenses. With all the emphasis being placed on high-index lens materials these days, some eyecare professionals (ECPs) have defaulted to one or two of them for all patients.

Sure, any lens will be thinner if made using a higher index material than a lower index one, but a lens has many more features than just index of refraction. Think of a lens as a package of features. In other words, when you recommend a lens, it's a package deal—the patient receives all the features it has, not just one or two. The trick to recommending the most appropriate material for the patient is to determine the patient's needs and match them to the best set of lens features you can find.

As you analyze the data presented above, you begin to realize that you can begin forming an idea of which lens material might be suitable for the patient based on her Rx. This is surely not the final decision; it is simply the first piece of the puzzle.

To help you formulate a way of making the decision of which one is the most appropriate, consider creating a table of all the lens materials that you use and place them vertically into one column from the lowest to the highest index. Next to each, put the range of Rx's you feel might be most suitable for it. If you do this, you will probably distribute the Rx's across the material offerings, not place them all into the row of one lens material. That's the logical thing to do… but are you actually doing this in practice? Probably not.

Practicing opticianry means using your judgment. Making a lens material choice is one of the most important decisions you will make for any eyewear patient. Its selection should be done with careful consideration of many factors. If one lens material is really the best choice for all patients, then a machine can do lens selection since your personal analysis and interpretation is not needed.

Contact lens practitioners do this kind of objective investigation as they do their workup of a patient. It's an important part of deciding which lens material is suitable for a given patient.

PHOTO COURTESY OF ESSILOR OF AMERICA, INC.

CHOOSE WISELY Making a lens material choice is one of the most important decisions you will make for any eyewear patient.

SUBJECTIVELY SPEAKING

Once you have reviewed the prescription and considered its power in regard to material choice, the rest of your information will come from subjective questioning. The importance of this kind of analysis cannot be understated. Careful questioning is the key to discovering a patient's lifestyle. Once you understand the demands he feels are important for his vision and eyewear, you can match the features and benefits of the proper lens material to him.

The trick to making this work the best for you is to construct your questions carefully so that they unearth the appropriate information. The questioning needs to not only discover the patient's eye use information as well as his wants and needs, but also to determine the degree to which each issue he raises bears on the lens material choice.

For example, if a patient indicates that she would really like to have fashionable lenses with a flash mirror treatment, ultra-thin lenses, and a high degree of impact resistance, which one of these is the most important in the lens material choice? Which is the second most important? Which is the third? Sure, you could offer this patient a 1.74 plastic lens material—the highest plastic material on the market, but is this the right thing to do? Perhaps, but only if she (and you) feel that thinnest is the most important aspect of her lenses while the other factors are addressed in some way. Perhaps the impact resistance should take priority since it will help protect the wearer's eyes better than a less impact-resistant material. Decisions like this are all a part of lens material selection. »

WHEN YOU RECOMMEND A LENS, IT'S A PACKAGE DEAL—THE PATIENT RECEIVES ALL THE FEATURES IT HAS, NOT JUST ONE OR TWO. DETERMINE THE PATIENT'S NEEDS AND MATCH THEM TO THE BEST SET OF LENS FEATURES YOU CAN FIND.

QUESTIONS TO ASK

Since questioning is the vehicle used to getting the information you need to make lens material choices, careful questioning is essential. Patients often do not like to fill out forms and answer questions about their health, but it is important for you to ask probing questions if you are going to select the best lens material for them.

Open-ended questions are the best type to ask because they give the patient a chance to provide an in-depth answer instead of a one- or two-word response. Even so, avoid questions like, "What is the most important thing to you when selecting lenses?" It's just too open-ended and most patients have no idea how to answer or what lens characteristics are important.

A better way to handle this would be to ask something like this: "How would you rank the following lens characteristics in order of importance to your new eyeglass lenses?" Now ask the patient to rank them from one to six with one being the patient's primary concern.

- Thin lenses
- Durability (scratch resistance)
- Glare protection
- Light weight
- Impact resistance
- UV protection

This is an interesting way of obtaining this information because it lets the patient tell you what he thinks are the most essential aspects of his eyewear and why. Often, ECPs get the information they need but do not always understand which lens parameters are the most important. This questioning technique solves that situation. The answers that patients provide will also guide you to the lens material that will address their concerns.

CLASSIFYING INDEX OF REFRACTION

Since index of refraction is a major factor in thin lens profiles, it's worth exploring this aspect of material choice. Index of refraction is a unit of measure that indicates how readily a lens material can refract light rays. The higher the index of refraction, the more the material will bend light rays. Therefore, a higher index lens will require less curvature and thickness than a lower index material when the lenses have the same power and diameter.

As the index of refraction increases, a lens of a given prescription and diameter needs less curvature and thickness to produce the same power. For plus lenses, this translates into thinner centers; for minus, it means thinner edges. An increased index of refraction can have a dramatic difference on the final thickness, weight, and profile of a lens. The reduced thickness translates into a lighter and more comfortable product, too.

Most ECPs recognize four material index categories—low, mid, high, and ultra-high. There is no official standard that subdivides these materials, but the optical industry generally follows this breakdown:

- Low-index: <1.53
- Mid-index: 1.53 to 1.58
- High-index: 1.59 to 1.66
- Ultra- or super-high index: >1.66

Check out the chart to the right for a look at some of the lens materials available and their index values:

LENS MATERIALS INDEX VALUES

LOW-INDEX: <1.53

MATERIAL	AVAILABLE FROM	REFRACTIVE INDEX
CR-39™	PPG Industries; Many	1.50
Crown Glass	Many	1.52

MID-INDEX: 1.53 TO 1.58

MATERIAL	AVAILABLE FROM	REFRACTIVE INDEX
Trivex®	Several	1.53
Spectralite®	Carl Zeiss Vision	1.53
High-X 1.55	X-Cel Optical	1.55
EvoClear® 1.56	Signet Armorlite	1.56
SunSensors® 1.56	Polycore Optical	1.56

HIGH-INDEX: 1.59 TO 1.66

MATERIAL	AVAILABLE FROM	REFRACTIVE INDEX
Polycarbonate	Many	1.59
Thin&Lite® 1.6	Essilor	1.60
Finalite® 1.6	Carl Zeiss Vision	1.60
EYAS™	HOYA	1.60
TLX 1.6™	Signet Armorlite	1.60
EvoClear 1.6	Signet Armorlite	1.60
Hyper Index® 1.66	Optima	1.66

ULTRA- OR SUPER-HIGH INDEX: >1.66

MATERIAL	AVAILABLE FROM	REFRACTIVE INDEX
Clarlet®	Carl Zeiss Vision	1.67
Ultra Thin UV 1.67	Pentax Vision	1.67
1.67 Super SVAR	Seiko	1.67
Thin & Lite 1.67	Essilor	1.67
EYRY™	HOYA	1.70
Index 1.71	Polycore Optical	1.71
Thin&Lite 1.74	Essilor	1.74
NL5-AS 1.74	NIKON	1.74

ASK AWAY! Since questioning is the vehicle used to getting the information you need to make lens material choices, careful questioning is essential.

With all of the higher index lens materials available, ECPs as a whole have been moving to higher index lenses. These lenses offer flatter base curves so the resulting lenses shed some thickness. Their thinner, flatter curves look more attractive too. Thinner lenses are lighter in weight, and lighter lenses are more comfortable to wear. Since 92% of prescriptions fall between +/-4.00D, mid-index materials work nicely with this group. Higher index materials are more suitable for higher prescriptions.

Other aspects of choosing lenses include lens weight (specific gravity), Abbe value (chromatic aberration), durability (scratch resistance), and impact resistance (safety).

SPECIFIC GRAVITY

The physical term used to describe a lens material density is specific gravity. Most opticians know it as lens weight. The higher the specific gravity of a lens material, the heavier the lens will be. When choosing a lens material, you need to balance its thinness with its resulting weight. Weights of high-index materials vary considerably, with glass products leading the list as the heaviest. You might try to reduce a lens' weight by using a higher index material, but often, as the index goes up, so does the material's specific gravity.

An aspheric lens design is a good way to make lenses thinner, which also makes them lighter. What you need to determine is what the final weight of the lens will be using various index materials. This is the only way to be sure you are providing the lightest lens product. Unfortunately, this is not something you can easily calculate at the dispensing table with a chart, pencil, and paper. A good computer program is the best way to get this information.

Here are the lightest commonly used ophthalmic prescription lens materials.

MATERIAL	AVAILABLE FROM	SPECIFIC GRAVITY
Trivex®	Many	1.11g/cm³
HIGH-X 1.55	X-Cel Optical	1.20g/cm³
Spectralite®	Carl Zeiss Vision	1.21g/cm³
Polycarbonate	Many	1.21g/cm³

ABBE VALUE

When white light (e.g., sunlight) is refracted, it breaks up into a rainbow of colored wavelengths, which is referred to as "dispersion." This optical property of light results in a chromatic aberration. Dispersion reduces the quality of the lens' focus and can reduce vision. Patients usually identify it as seeing colored ghost images around objects viewed through the lens.

A lens' Abbe value indicates the amount of dispersion a lens material has. Like index of refraction, Abbe value is a unit of measure that indicates dispersive ability. The lower the Abbe value, the more the material disperses light (and the more troublesome the material can be for the wearer). Abbe values have been a constant concern with high-index lens materials, as higher index materials have lower values than their lower index counterparts.

Abbe value cannot be controlled with lens design like some other lens aberrations because it is inherent in the material. The way you control it is to choose a lens material that has a value that is high enough not to be troublesome for your wearer.

The following lens materials control Abbe value very well:

MATERIAL	AVAILABLE FROM	ABBE VALUE
Crown	Many	59
CR-39™	Many	58
Superfin®	INDO	48
Spectralite®	Carl Zeiss Vision	47
Trivex®	Many	43-45

DURABILITY

When choosing a lens material for a patient, durability is an important consideration for many buyers. When CR-39™ plastic first became popular for ophthalmic lens use in the early 1970s, lens durability became a topic of discussion. Since glass withstood scratching fairly well, lens buyers wanted to know about the scratch-resistant properties of the new plastic lenses. Unfortunately, it was not that good. The answer to this dilemma was an anti-scratch treatment. This added layer greatly increased the scratch resistance of plastic lenses and has become a standard addition to most plastic lenses.

The way for you to manage lens durability is to choose lenses that have the kind of anti-scratch and tinting properties you want. This means that you'll have to do your homework to discover which lenses offer the kinds of properties you find appealing. Just ask the lens manufacturer or your lab for this information. »

WITH STRONG PRODUCT KNOWLEDGE AND BY ASKING THE RIGHT QUESTIONS, YOU WILL BE ABLE TO RECOMMEND THE RIGHT LENS MATERIAL FOR PATIENTS' EVERY EYEWEAR NEED.

FACT CHECK Be up-to-date on product availability and have this information readily available.

Advancements in hard coatings have significantly brought scratch resistance to impressive levels. These coatings are either organic or inorganic in composition. Inorganic materials produce a hard, quartz-like surface that is very resistant to scratches, but non-tintable. The coating is applied in a vacuum chamber much like a mirror or anti-reflective (AR) treatment.

Organic hardcoatings are usually applied by spraying, dipping, or spinning and cured in an oven. The softer the treatment, the easier the lens will tint, but the more prone it is to scratching. The anti-scratch material "recipe" is what determines its scratch resistance and tintability.

IMPACT RESISTANCE

These days, most ECPs are concerned about the impact resistance of lens materials. Since the introduction of polycarbonate lens material a couple of decades ago, the issue of impact resistance has steadily increased. Unfortunately, one reason for this is because of huge lawsuits and judgments against eyecare providers.

The lawsuits often stem from the "Duty to Warn" concept found in tort law that is often applied to manufacturers of products. Another reason for the rising interest in lens impact resistance is the professional responsibility ECPs feel about providing their patients the safest lens material they can.

Impact resistance is an inherent characteristic of a lens material so the way for you to manage this aspect of lenses is to choose the one that provides the impact properties you want. Materials like polycarbonate and Trivex have increased impact resistance because they are soft and flex with impact. The following lens materials are particularly impact resistant.

- Polycarbonate
- Trivex®
- NXT®
- SR-91®

If you are selecting lenses for safety applications, be sure the lens material you have chosen is capable of passing the ANSI Z-87 impact standards. The tests in this standard help assure that the lens products you dispense meet the special needs of the safety environment.

AVAILABILITY FACTOR

Many of today's new lens designs are only available as specific materials. This is clearly a limiting factor and one that you need to consider as you prepare to recommend a lens material to a patient. Nothing is more frustrating for the patient and embarrassing for the ECP than working through a good deal of time choosing a lens only to find that it is not available in the material (or design or lens option) you both thought was best. The only outcome of this is the patient receiving what they will consider as second best.

Of course, the way to avoid this problem is to be up-to-date on product availability and have this information readily available. Never recommend something you are not sure you can provide. Always check first before you mention the possibility to the patient. Any other approach invites patient dissatisfaction and doubt.

COST AS A FACTOR

While ECPs would rather not have to deal with this issue, cost can be a factor in which lens material a patient selects. Today's higher index materials and those with advanced features like superior impact resistance command a higher price. While they may well be the best choice for the patient, the additional cost over a lower priced lens material may deter the patient from buying it.

In this case, the best defense is a good offense. Be prepared to discuss the features and benefits of the lens material and make sure the patient understands what he will be missing if he doesn't accept your lens material recommendation. This often solves the problem. But if the patient insists that he wants a less expensive option, you will be forced to recommend something less ideal.

With strong product knowledge and by asking the right questions, you will be able to recommend the right lens material for patients' every eyewear need. Making the right lens material recommendation is a very rewarding part of ophthalmic practice, so keep up with new lens designs and materials. It's challenging but fun. ◘

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LENS MATERIALS AND TRETMENTS CE SELF-ASSESSMENT TEST

Please fill out the Answer Sheet at the end of this test. Respondents with a passing score will receive one (1) hour of CE credit. Respondents seeking COPE credit need to receive a passing score of 70 or more and should answer the first 10 questions only. Those seeking ABO credit need a passing score of 80 and must answer all 15 questions. This test is valid through April 1, 2009.

1. The higher the index of refraction, the more _____.

a. it will increase the material's specific gravity
b. it will decrease the material's impact resistance
c. effect it has on the material's Abbe value
d. the material will bend light

2. For a given diameter and lens power, what effect will increase the index of the lens material have on a lens?

a. It will be thicker and have steeper curves.
b. It will be thinner and have steeper curves.
c. It will be thicker and have flatter curves.
d. It will be thinner and have flatter curves.

3. In which index category does Trivex® fall?

a. low
b. mid
c. high
d. ultra-high

4. What does the specific gravity of a lens material indicate?

a. impact resistance
b. weight
c. dispersive ability
d. thinness

5. The _____ the Abbe value, the _____ the material disperses light.

a. lower, less
b. higher, less
c. lower, more
d. higher, more

6. As a general rule, lower index materials have _____ Abbe values than their higher index counterparts.

a. lower
b. equal
c. higher
d. there is no relationship or trend

7. Which of the following statements is correct regarding inorganic hardcoatings?

a. They make lenses easy to tint.
b. They are applied by spin coating.
c. They produce a quartz-like surface.
d. They make lenses more prone to scratching.

8. The subjective criteria for lens material selection includes _____.

a. Rx parameters
b. facial measurements
c. patient input
d. physical conditions

9. What percentage of Rx's fall above +/- 6.00D?

a. 3%
b. 85%
c. 92%
d. 95%

10. According to the text, what are the best type of questions to ask during the lens selection portion of the eyewear interview?

a. closed-ended
b. opened-ended
c. pointed
d. investigative

OPTICIANS ONLY. Please answer these five additional questions:

11. Which of the following has a direct effect on a lens' profile?

a. Abbe value
b. index of refraction
c. specific gravity
d. wavelength

12. Which of the following mid-index lens materials has a low specific gravity?

a. EYAS™
b. polycarbonate
c. Trivex
d. Thin&Lite® 1.74

13. Which of the following is a Carl Zeiss Vision lens material that has a high Abbe value and a low specific gravity?

a. Claret
b. Lantal®
c. Spectralite®
d. ViZio®

14. Besides polycarbonate and Trivex, which other two lens materials offer superior impact resistance?

a. Supefin® and NXT®
b. Spectralite and SR-91®
c. EYAS and Claret
d. NXT and SR-91

15. According to the text, what should be the ultimate goal of every eyecare professional when it comes to recommending lens material?

a. Recommend lens materials that make the most money.
b. Include patient input into the selection of a lens material that meets her or his needs.
c. Recommend lens materials that have been around and have a proven track record.
d. Make lens material selection based on patient's ability to pay.

ANSWER SHEET

Fill out and mail this portion to: *Lens Materials and Treatments CE, c/o First Vision Media Group, Inc., 25 East Spring Valley Ave., Suite 290, Maywood, NJ 07607 or Fax to: 201-587-9464. Be sure to fill out form completely. This CE article is also available at totallyoptical.com.*

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