

Compensating & Therapeutic Lenses: Passive vs. Dynamic Prescribing *An Essay*

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Abstract

There are two principle approaches to prescribing lenses - compensating and therapeutic. Compensating lenses can be a means of masking symptoms. The act of masking symptoms may allow underlying problems to remain or worsen. It is also possible that unwanted side-effects may result, creating new problems. Therapeutic lenses can stimulate visual and overall development, prevent adverse visual adaptations, reverse adverse visual adaptations, improve visual performance, and reduce visual stress. Decades of clinical success in the use of convex lenses demand a closer look at what optometry has to offer.

Key Words

compensating lenses, therapeutic lenses, prevention, visual process, adaptation, performance, homeopathic, allopathic

Lenses are powerful tools which can have a significant impact on human beings. This is even more critical as we increasingly move into the computer age with its accompanying increased demands and stress placed upon the visual process. Compensating lenses are prescribed to override some aspect of the optical or binocular systems of the eyes. The thinking is that this will redirect light rays from a point source in order to place a focused image on the fovea. Compensating lenses can be used for various difficulties with visual acuity, accommodation, and/or binocularity. However, there are many circumstances where compensating lenses should not be the first level of intervention. We can do much more than simply compensate for refractive or binocular states when we prescribe lenses therapeutically. Therapeutic lenses can be used to induce positive changes in many visual conditions. Such lenses deal with underlying etiologies not symptoms. Therapeutic lenses can be used to prevent visual problems from manifesting and to counteract adverse responses to visual stress. They are used in a specific manner to affect fundamental changes in visual processing and subsequent performance. Thus, lenses provide a safe yet powerful means of influencing human behavior on many levels.

For the most part, standard optometric practice utilizes lenses strictly as compensatory devices. The classical approach to prescribing lenses is like the classical, or allopathic approach to medicine in general. Allopathy is defined as treatment of a dis-

ease by remedies that produce effects different from or opposite to those produced by the disease.¹ For the most part it avoids dealing with the true causes and instead attempts to manage conditions by obscuring the symptoms. There is also the tendency for people to have something done *to* them. This approach serves to remove a person's responsibility and power over her own healing process. The power and responsibility are turned over to an expert and/or some external device. Another problem is that undesirable side-effects often go unnoticed, or are considered inconsequential or unavoidable, and therefore acceptable. Compensating lenses may be prescribed for nearsightedness, farsightedness, and astigmatism. They may also be used to compensate for improper eye alignment and visual field defects. There are patients for whom this may be the best, or even the only approach possible for various reasons. There are also ways in which lenses can be used more creatively and dynamically to benefit patients who present with a wide variety of complaints.²

There is a general sense in optometry that there is nothing more to learn about the art of prescribing lenses. This is due, at least in part, to the fascination with new technologies - from contact lenses to corneal reshaping. These are all exciting innovations that need not supersede a more dynamic, functional approach to vision care. It may be possible to utilize these new technologies and medical procedures within a behavioral framework. We seem content for the patient to read the bottom

line on the chart regardless of other issues. There are other ways to use lenses as expounded in the pioneering works of people like Louis Jaques,³ A. M. Skeffington,⁴ Robert Kraskin,⁵ Bruce Woolf, and Lawrence Macdonald⁶. These individuals understood the complexity, development, and plasticity of the human visual processing system. They proposed that the strength of optometric care was not merely in the treatment of an optical system, but more in the ability to enhance the patient's visually guided behavior and performance. People with various refractive conditions were often found to behave in ways that were inconsistent with their measured optical or refractive states.⁷ The concept of treating the individual as opposed to the condition, or even the condition's statistical data, is an important issue⁸ in itself, although it will not be directly addressed in this article.

Unquestionably, the ability to compensate for the visual conditions cited above is of tremendous benefit within our culture. People need to be able to see clearly at all distances, under a variety of conditions, with unhesitating flexibility and accuracy as well as endurance. It is a simple matter to make this possible in most cases. Consequently, it is easy to gloss over other issues and prescribe the standard compensating lenses for those who come to us with the major complaint of blurred vision. However, it is incumbent upon us to educate the public. Optometrists have access to the most thorough background in vision and optics, and we are readily accessible to the public. Therefore, we should achieve the highest level of understanding and most complete knowledge of diagnostic procedures as well as available, appropriate treatment options. We must strive to inform the public that lenses can be used effectively to stimulate visual development, prevent functional vision problems, and ameliorate or cure visual problems that have already caused symptoms.

The use of bifocals and low plus lenses in children is one example.^{9,10} The constant use of vision at the nearpoint is a frequent source of strain on the system. The problem is further compounded when there is stress to perform at a certain level of quality. The visual process is fundamentally concerned with a volume of space.^{6,11,12} It guides our perceptions and other actions in areas including our orien-

tation to light, motion, and gravity, the relative locations of other "objects" within our environment, and the meaningful identification of all aspects of the environment.¹² The chronic involvement in sedentary, near, two-dimensional activities is a relatively new phenomenon. Although our visual systems were not designed for the type of activities that we must do to survive in our culture, some of us seem quite able to handle this type of visually stressful workload without additional help. Others suffer various functional breakdowns. The help needed by those who struggle may come in the form of lenses and/or visual training. It may also come in the form of dialogue, education or advice. The average person has little understanding of the complexity of the visual process. Neither is there adequate awareness of the issue of visual hygiene, let alone its importance.

The therapeutic use of low plus lenses is often effective. It can be instrumental in preventing a more serious, long-term breakdown in visual performance for those whose visual systems have begun to show signs of compromise.^{4,5,9,10} The use of compensating lenses usually arises from the belief that the condition is irreversible, in fact one that is likely to worsen over time. (It will continue to worsen until, for some inexplicable reason, it stops.) Since it is felt that this function cannot be adequately carried out by the individual, compensating lenses are applied to do the job. This merely overrides the specific function that is not being properly handled. Such lenses do nothing to address the possible (or obvious) *cause* of the problem, nor do they provide a means of improving the condition. They do, in some cases, allow the person to function as though the primary complaint is absent. Compensatory prescribing is a passive response to what is considered to be a passive problem. There is neither anything in the diagnostic procedure, nor subsequent treatment that even begins to address whatever concomitant conditions may also (almost always) be present. It is unusual to find an undesirable refractive measurement in the absence of any other functional signs or symptoms. Refractive change tends to be no more than a single piece of the adaptive puzzle.

The visual process is complex and dynamic. It is not an eyeball phenomenon. There are at least a dozen pathways which

branch off the optic nerves.^{13,14} The visual process is not designed merely to passively receive images. Its primary function is that of guiding action, either mental, verbal, physical, or some combination, in response to light. The major function of the eyeball is not to provide an image; it acts as "a gradient detector."¹⁵(p.22) Light spreads across the entire retina, mediating electro-chemical messages along the numerous subsequent pathways.¹⁶ There is no proof of the presence of an actual photograph-like image on the retina, or anywhere else in the brain. In fact, there is no actual proof of the existence of photons.¹⁷ These are merely convenient ways of describing certain aspects of the world to make it easier to communicate our subjective experiences.

There are a number of issues consequent to the passive approach to lens prescribing that are generally not considered. For example, there is a lack of sensitivity to the consequences of viewing the world through optical devices.¹⁸ For example, when one views through a concave lens, there is typically a change in the apparent size of the object of regard as well as the entire background. The world is spatially displaced, bringing it closer to the viewer. There is therefore a compression of space in all three dimensions which cannot occur without a corresponding change in perception of time. Einstein's theories have proven the inextricable link between time and space.¹⁹ Unfortunately, the implications of these theories have yet to be utilized to their fullest throughout the sciences. Anything that occurs in space occurs over a period of time: there is the time it takes to process information, the time it takes to initiate a response, and the time it takes to carry out that response. Therefore, any distortion of spatial perception distorts temporal perception as well. Whether or not the individual is aware of these changes, they are optical properties of the lens.

A person habitually wearing such lenses must adapt to these changes and behave as if they no longer exist. However, adapting to such distortions does not eliminate them. It creates a kind of virtual world. It reduces one's sensitivity to these and other changes and distortions in our internal and external environments. This reduction in perceptual sensitivity can lead to further deterioration of the overall visual process. This deterioration, being a

work-in-progress, will most likely proceed in the direction which has already been established. That is, if someone has "chosen" a particular path of adaptation, compensating lenses will typically result in a continuation along the same path. Therapeutic lenses will interrupt this process, and help redirect movement in a positive direction. This is equally true in cases of nearsightedness, farsightedness, and astigmatism, as well as binocular and accommodative conditions.

There are also fundamental, subtle changes which frequently occur as a result of the habitual use of compensating lenses. Spectacle lenses encourage head rather than eye movement due to various distortions that occur away from the optical centers. This causes reduced efficiency, more rapid visual fatigue, and a tightening of the neck and extra-ocular muscles. Higher power spectacle lenses also create prismatic distortions which may encourage various binocular difficulties.

When nearsighted individuals constantly wear standard compensating lenses based on optical findings, they overwork their visual systems up to 90% of the time. Such a prescription is directed at best distance acuity at 20 feet (optical infinity) and beyond. Very little of our time is spent viewing at such distances during our normal routine. Many of us generally spend most of our time indoors where viewing distances typically range from 16 inches to 15 feet. Occasionally we need to view at greater distances, but these situations are usually of brief duration. Nevertheless, people have different needs and should be cared for accordingly. Some need the full compensating prescription to feel comfortable and secure, and to function most effectively in their everyday environment. Unfortunately, it is all too easy for most to wear full-strength, compensating lenses on a full time basis, seeing clearly at all distances with apparent ease. It is unfortunate because there are many times when a less than optimal tool can be used in a seemingly effective manner to complete a task. For example, it is entirely possible to use a sledge-hammer to hammer in a nail. However, repetitive use of this tool for this task could have various consequences. There can be increased muscle density in the arms, and/or arm fatigue, or some sort of repetitive motion disorder. Consequently, there can be a more appropriate sized hammer for this kind of job. Similarly, a full-

strength compensatory prescription is a kind of optical sledge-hammer. Using this tool will not lead to increased muscle density in the eyes; it will only lead to increased visual stress, reduced flexibility, and a continuation of the behavior and subsequent adaptive process which initially caused the adverse response in the first place.

As the human organism adapts to visual stress, various patterns of function are attempted, perhaps randomly, to make the job go easier - in the present moment. This is analogous to the growth of a plant. A plant growing vertically straight will change its growth pattern if its exposure to the sun is impeded; it may bend in any number of directions attempting to regain maximal exposure. Without direction and guidance, the endless possibilities are accessed and attempted, in various patterns, with varying emphasis on different components and possibilities.²⁰ In the human version, whatever is changed at that moment, to bring comfort and relief, becomes familiar and may be kept at the ready for the next moment. If it works again, it becomes a useable solution and then a behavior pattern. A few moments down the road may expose a slightly, or dramatically different problem to solve. This may lead to a modification of the previous solution or a totally new solution/behavior pattern. It may also lead to an attempt to utilize the previous modification to carry out this new task. The full-scope success or failure of this maneuvering is, for all intents and purposes, a matter of chance unless there is some guidance of the process based on an understanding of all the factors involved.

This process repeats itself at many moments and in many ways. In the plant analogy this will produce changes in growth patterns. If the difficulty is sufficiently great and prolonged, it can lead to structural damage or worse. The obstruction can be removed at any point and kept away, allowing growth to proceed normally from that point onward. However, by then, the structural changes may be physically embedded. Support mechanisms can be instituted to minimize the impact of the structural damage, such as tying the plant to a sturdy external pole; this will maintain a sufficiently upright posture.

These same types of things can happen very early in human life and unless there is

some type of closure, some true resolution that works for most moments and most problems, this process may continue indefinitely. Most often there is a closure which, if unguided, typically results in a resolution that is inefficient and cumbersome although better than a free-floating state with no standard operating procedure. The supporting pole, in the human version, might be a therapeutic lens. This might not completely reverse the structural changes, but may be sufficient to allow performance to proceed more normally.

All optometric findings reveal the outward signs of some adaptive visual process. Our findings do not represent the visual problem. They represent the direction and style of a person's response to a visual problem. This is the typical relationship between outward signs and symptoms of illness, and the actual disease process.⁸ Most visual difficulties are the result of a person's inability to handle the load placed on the visual system by some task or demand, some disruption in the developmental process, or a combination of these. In order to come to terms with the demand, some adaptation must be made if things are not going smoothly. The most common, most practical adaptation is the move to myopia. The person gives up distance acuity¹¹ in favor of creating a new farpoint of focus, one that significantly reduces demand when viewing at near. With this comes a move to reduce the overall volume of space.

The near viewing distance is the one which occupies most of our time, starting at an early age. It is also the place where our performance tends to attract the most scrutiny, whether it be school- or job-related performance. This leads to considerable stress associated with performance at the near viewing distance. It is therefore necessary to make this type of activity as easy as possible. The move toward nearsightedness is both clever and effective in this regard. Were it not for the degradation in overall visual performance that typically results, this adaptation would be an excellent aid to achievement within our culture.

Someone who has begun this adaptive maneuver typically seeks an eye exam, and is found unable to achieve normal distance acuity. Based solely on this factor, lenses are provided to reestablish clinically acceptable acuity. These lenses do not take into account the individual's true everyday needs. Neither do they address the true

causes of the active process creating this outward sign. The prescription is based solely on one or two outward signs at that moment. It cannot be overemphasized that the outward signs indicate the individual's attempt at a solution, but not the underlying problem. It is the modification that has been made in order to fit in, achieve, and survive that is actually being measured. Nearsightedness has been used as the primary example, but much the same could be said, as far as diagnosis and treatment, of farsightedness, astigmatism, and other binocular and/or accommodative conditions.

Another problem is that standard eye exams increasingly rely more on technicians and automated devices to take measurements²¹ which, if done by the optometrist, might reveal much useful information. Such information may be critical in gaining a comprehensive understanding of a patient's true condition, needs, and the best way to treat the whole person. Neither ancillary office personnel nor mechanical devices provide even a fraction of the information available through distance and near retinoscopy (not to mention a comprehensive battery of probes) performed by a skilled optometrist.

The clinical experience of numerous optometrists and the real life experiences of countless patients indicates that it is possible to prevent the onset, retard, or even reverse the progression of nearsightedness, farsightedness, and astigmatism. In all cases, it is a matter of understanding these conditions in the context of some fundamental difficulty with visual processing. Therapeutic lenses provide the most powerful means of bringing about positive changes in visual processing. With or without the benefit of visual training, they can enhance the normalization of binocular and accommodative functioning, visual spatial perception, and peripheral visual awareness. These lenses differ from compensating lenses in many ways. Their use is not aimed at directly improving acuity at any distance, nor to take over some function of the optical system. They serve to enhance overall visual function, and will lead to positive and lasting changes over time, if prescribed and worn properly. These lenses are not prescribed based on a single finding (change in distance acuity). They are based on some type of thorough functionally-based

evaluation of the visual process, an understanding of the underlying process of adaptation, and a complete evaluation of the actual visual performance demands of the individual.

Medicine is defined as any substance, drug, or means used to cure disease or improve health.¹ Lenses are therefore a type of medicine even though they are not taken internally. They can promote changes in behavior, or effect the way one feels. Appropriate near lenses can affect positive changes in school performance and work performance as well as overall behavior. These lenses can also bring about changes in a person's level of comfort by eliminating eyestrain, eye pain, or headaches. While in some cases compensating lenses can be seen to provide some of these same benefits, these changes are typically evident only when the lenses are being worn. This is not unlike some types of internally taken medications. They are effective only during an active phase, and when this phase elapses, the symptoms return. In the majority of cases therapeutic lenses create more long-lasting changes. In fact, it is generally the case that such changes will become permanent since the primary action of the lenses is to affect internalized changes in behavior and performance.

When used in very small amounts, convex lenses, yoked prisms, base-out and base-in prisms can have an effect which is analogous to the effects of ingested homeopathic medicines. Homeopathic preparations are designed to stimulate the body's own mechanisms for healing. Homeopathic medicine uses "like to treat like." It employs what is classically considered to be an insignificant amount of a substance which, when introduced into the body, stimulates learning by the immune system. This enables the system to respond more effectively in similar future situations.²² This is unlike an immunization which uses more significant amounts of a substance to trigger an actual response to the toxin. This can cause an actual illness from the exposure.

Standard compensating lenses and prisms are allopathic in nature and function as a crutch by essentially taking over the work that the visual system is unable to carry out effectively. They serve to mask the actual problem by creating the illusion of more accurate input. When these lenses are not worn, there is no im-

provement in visual performance. In fact, there is typically a reduction in performance over time which creates the need for stronger compensation. This is true in cases of nearsightedness, farsightedness, astigmatism, and strabismus. Because of the intimate relationship between vision and behavior, it is important, if not necessary, to attempt to directly influence behavior (at least visual behavior) through visual input and processing. Compensating lenses, if they do influence behavior, do so in two ways that run counter to homeopathic philosophy. They are prescribed by measuring the magnitude of refractive error, or by the magnitude of the phoria or tropia which ignores the root of the problem. This approach typically forces the wearer to change behavior by becoming "one with" the compensatory device. That is, by giving in to the demands of the device, by resigning oneself to a certain level of dependence on the device, one makes internal changes to become more comfortable with, and more adept at utilizing the device. This often necessitates increasing the strength of the compensating lens over time.

The homeopathic approach to lens usage stimulates a gentle change in the wearer's relationship to the environment. This serves to provide an option, or options, to perceiving and responding to the environment. Typically, these devices can be removed, once the learning they stimulate has occurred, and the desired changes will remain. This will most likely take place when the change is positively received, which indicates that it is of benefit to the individual. Subconsciously, we continually search for the path of least resistance and most effectiveness. We also need to feel good about the person with whom we have chosen to work, and his approach. "The power of the mind is such that when you take medicine with the understanding and trust that this medicine has some property that is going to work, this gives confidence and peace of mind. The combination of mind and medicine speeds recovery."²³ It is difficult to achieve this if we do not have options. Without awareness of a broader context, we can only know what is immediately obvious. When there are meaningful choices available to us, we have the power to select what suits us.

As a result of the ideas, energy, and communication skills of Skeffington and

those around him, the discipline of behavioral optometry was fortunate to avail itself of a more thorough means of visual analysis. This led to improved ability to employ lenses therapeutically for gentle and effective manipulation of visual performance, which in turn effects overall behavior. The ability to utilize lenses for the enhancement of performance, or the prevention of visual problems, need not be the exclusive domain of so-called behavioral optometrists.²⁴ In fact it is too important a concept to remain unused by the vast majority of those prescribing lenses on a daily basis. The accurate diagnosis and subsequent treatment of functional visual disorders through the use of therapeutic lenses²⁴ represents a state-of-the-art technique which should be as much a part of the so-called "standard of care" as procedures such as retinal photography, automated perimetry, and the use of therapeutic pharmacological agents.

In fact, the possibility of preventing visual problems, reversing adverse visual adaptations, and guiding developmental processes through the use of ophthalmic lenses is like a rare antique buried in the attic of optometry. Uncovering this gem could rejuvenate and differentiate the profession of optometry in many ways, not the least of which is the potential for increased income. This issue seems to be gaining importance throughout optometry with the proliferation of third party plans. If the profession as a whole embraced the developmental, stress-relieving, preventive, and performance-enhancing capabilities of lenses, more people would seek our care more often. We would also be dispensing more glasses. However, the goal here is not to simply increase our collective income: the goal is to provide the highest possible level of care to the greatest number of people. For some, the behavioral philosophy includes the concept that everyone who spends time reading, writing, or sitting at a computer should be wearing lenses that help the visual system cope with activities for which they were not designed.^{2,3,4,11,24} These are the same activities that are causing epidemic visual breakdown in people of all ages.

A similar phenomenon has already occurred in dentistry. For years the tendency was for people to seek care when there was pain or other types of dental discomfort. In more recent times the profession effec-

tively educated the public about preventive care. In fact, preventive dental care is covered by insurance. This not only increased the income of dentists everywhere, but has raised the level of dental health significantly. This has been achieved in two ways. First are the new methods of coating children's teeth periodically to protect them from getting cavities in the first place. Second is the trend towards biannual cleanings to keep teeth in a healthier state. If optometry could unite on the issue of visual hygiene via proper lens use (and other related precautions such as posture, lighting, etc.) and proceed to educate the public, we could find ourselves at a new level of public demand and respect. We need to get the public and the profession to think of vision care as a positive thing. This would also help differentiate our profession at a time when we are in serious danger of being absorbed into the discipline of ophthalmology. We can channel the development, effectivity, and comfort of visual performance instead of focusing exclusively on critical ocular and visual problems.

The real importance of the ability to affect positive changes via ophthalmic lenses is the fact that the visual process is the most important interface between a person and her environment. This environment includes internal territory as well as the external terrain.^{18,25} We must successfully navigate through both sectors of our environment throughout our lives. It is vital to have a highly accurate and flexible means of interpreting our world in order to achieve the highest level of performance, with maximum comfort and efficiency, if we are to hold our own in a fast paced, visually demanding, and visually stressful culture. Our perceptions of the external world effect our internal perceptions in many ways, and vice versa. Improved visual performance and reduced visual stress will have positive repercussions in all areas of people's lives. The safest, most effective means of providing such opportunities is the dynamic use of lenses.

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