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Dilemmas of Optical Dispensing

Optical dispensing is as much an art as science. Every day brings in a new challenge. Often after taking utmost care we are confronted with situations that we do not anticipate and hence we are caught in a situation that requires careful consideration and critical thinking to arrive at appropriate decisions. Such a situation arises when after all your great effort the patient complains that he has some difficulties in seeing with his new glasses or he is not comfortable or he has a severe problem with his new glasses. These are real optical dilemmas that create problems for many opticians and the biggest irony of the situation is that no perfect solution exists to most of them. Therefore, we have to end with some compromise to which the patient adapts over a period of time. That is why a judicious strategy has to be followed to unravel the situation and see the way forward that may be based upon basic knowledge of optics, how human eyes work and critical brainstorming on the issue.

Just to recapitulate the process of vision completes with motor co-ordination of two eyes and the sensory unification of their respective views of the object. Light rays enter the eyes through the cornea, go through a focusing lens and create an inverted image on the retina. The retinal cells transform the light energy into neuro-electrical impulses which are transmitted to the optical centre in the brain where they are converted into a correct image. Responding to brain orders, the external muscles act to co-ordinate the two eyes with each other and internal muscles bring the image into focus. The two eyes are separated by a distance of approx 60 mm and bring in a slight different perspective of the world that allows stereoscopic view. Thus

the process of vision is highly balanced and controlled where efficient teaming of two eyes is needed. Anything that makes it difficult for the eyes to work together to keep the object in clear focus can cause dizziness, headache, reading difficulties or blurred vision. Some patients may have one of these symptoms while others may have two or more.

When spectacles are worn for the first time or changed to a new one, there is a profound effect on the neuro-muscular mechanism of the eyes through their influence on accommodation. A young hyperope who could manage to see distance with accommodation and needed to accommodate more to see near, now do not need to make an effort to accommodate for distance vision. A young myope who could see near without using accommodation has to start accommodating to see at near. Accommodation is also associated with convergence. Spectacle lens causes changes in the perception of space which is more evident in case of high power. They also change the size of the retinal image. Plus lens magnifies and minus lens minimizes. In addition certain other aberrations are also induced which are more pronounced when seen through the lens periphery.

Sometimes a new spectacle correction can take quite some time before being comfortable to the user. This does not necessarily mean that glasses are wrong. As long as straight ahead vision is clear, most effects will resolve completely within a week to ten days. But for some patients it may be an unpleasant experience. Some of the common problems that may be experienced by patients are:

Size judgment

The universal truth is that plus lens makes the image larger and minus lens makes the image smaller. However, the effect of magnification or minification may be reduced by reducing the vertex distance of the spectacles, making them closer to eyes. Alterations in base curve may also alter this effect. Steepening the base curve of the lens may bring in a bit of magnification for myopes and flattening the base curve may minimize the effect of magnification for hyperopes.

Distance judgment

Our brain carries a past experience of an object of regard and when we put on the new glasses plus lens makes the object look bigger and minus lens makes the object look smaller. So when we look at an object with plus power, the brain wrongly decides that it must be closer. The opposite is true for myopes. Usually it goes after a few days. Myopes adapts quicker than hyperopes.

Giddyness

Our visual system is connected to the vestibular system. The job of the vestibular system is to sense changes in motion. The vestibular system works in conjunction with the visual system to detect head and body motion as well as eye movement. This interaction is called the opto-kinetic system, which serves as the body's motion detection system. When the plus lens magnifies the size of object, the equal vestibular response is not enough and eyes need to make a larger angular deviation to remain on track. This may cause motion sickness which leads to giddiness. This occurs because of disagreement between what eyes and ears tell the brain. Giddyness may also occur when one eye is less involved in the vision process than the other. This is because of deterioration in vision or spatial awareness.

Slopping

A plus astigmatic lens magnifies more in one meridian than the other. It means that retinal image of a circle will be oval instead of circle. Similarly desk and floor may appear having sloped and door frames may appear distorted. Square paper looks trapezoidal when there is great change in cylinder or in axis of cylinder lens. This is a strange perception that goes with time, but it may be disturbing. It may be necessary to adjust the cylinder or the axis and with new correction the wearer may not see as clearly as with the previous correction.

Feeling too strong power

This is quite common when there is a major change or a new spectacle is worn for the first time. The brain takes time to adapt. You can apply a trick to manage. Ask the wearer to look at the distant object through the spectacle lens and pull the spectacle away from the eyes. In case of minus power, if it deteriorates the vision quality, it implies that the correction is optimum. If the vision remains same, it implies a slight reduction in minus power is justified. In case of plus power, pulling the spectacle away from eyes improves near vision with the optimum correction.

A patient with latent hypermetropia when corrected may also report the same. He may report good vision at near, but may complain of blurry distant vision. A short adaptation period would resolve the problem. Alternatively reduction in correction is warranted. In an extreme case lens index change may also be the reason.

Light sensitivity

Sometimes due to incorrect positioning of optical centre in its vertical direction, vertical phoria may be induced which may cause light sensitivity, difficulties with

glare and reflection. Some patients when switched from tinted to clear lens may also complain the light sensitivity.

Mild headache

A change in prescription or vertical phoria may also lead to headache. Intensity of new experience, consciousness about new glasses and lack of initial confidence and attitude to pinpoint the smallest defect in the glasses may contribute to headache.

Haloed around light

Very rarely patient complains of haloes around the eyes which are especially noticed in the night around car lights or tail lights in the night. Usually this is not associated with optical lenses, more associated with ocular pathology. But patient notices when they make the new lenses. They learn to live with the same.

Head motion sickness

Head motion sickness occurs because of poor stabilization of retinal image during head motion in the horizontal plane. This is more pronounced if the spectacle frame shape is steep rectangular or the patient's IPD is very narrow. The optics of the lens says that as the line of gaze shifts from the centre of the lens to the periphery, prismatic effect is induced. It is larger as the distance from the point to optical centre increases. With low power these effects are rarely noticed.

Floor seems concave

Many times after putting on new correction the patient feels as if he is standing in a bowl, or vertical objects seem taller than normal, or he feels as if he is walking uphill. These may be the symptoms of a hyperope looking above the optical centre of a pair of glasses or base of the prism is too low.

Floor seems convex

Sometimes the patient feels as if he is standing on a hilltop or vertical objects seem shorter than normal, or he feels as if he is walking downhill. This may be the symptoms of a myope looking above optical center of minus lenses.

End