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Strategies to Cope with Vision Loss

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Abstract: **Many people are affected by different types of vision impairment. Some of these types are less severe, while other forms constitute mild to extremely severe impairment. Visually impaired (VI) refers to low-vision individuals who after all treatments can still rely on some of their vision to plan and carry out some daily tasks, but they are unable to read print from a normal viewing distance, even if they use eyeglasses or other aids. In addition, they rely on a combination of vision and other senses to learn and perform their daily activities. This paper specifically considers the different types of vision impairment, causes of vision loss, strategies to cope with vision loss, vision impairment and sensory compensation, and assistive tools for low-vision people.**

Keywords: **vision impairment, Cataract, Diabetic Retinopathy, Glaucoma, Macular Degeneration (MD), Retinitis Pigmentosa (RP), causes of vision loss, coping with vision loss, assistive tools.**

I. INTRODUCTION

Emotional reactions to vision loss will include sadness, anxiety, depression, and stress. Many people have trouble dealing with the situation and cannot accept the reality. They start seeking help from low-vision organizations and support groups. Stress and depression are common reactions, as people take twice or more time to perform their daily activities. Symptoms of stress come in different types, such as headaches, stomach aches, and trouble sleeping (Wolfe, 2014).

The term “visually impaired” (VI) refers to individuals with LV who can rely on a combination of their limited vision and other senses to do daily tasks VI individuals are unable to read from a normal viewing distance even with the aid of eyeglasses and contact lenses (Catteneo & Vecchi, 2011, p. 138). Two terms in vision impairment that need to be understood are “object vision” and “travel vision.” Object vision is the ability of people to determine what kind of object they are seeing but not knowing its type or details, for example, seeing a person but being unable to recognize them. Travel vision refers to the ability to move in space independently without the help of a cane, a guide dog, or a guide (Chapman, 2001, p. 14).

There are different types of vision impairments, although the term `visual impairment` is used to describe in general the eye disorder. The different components in the eye work together to create the ability to see things When any of the eye components function improperly or communicate incorrectly with the brain it will cause vision impairment (Resource, 2015).

There are different types of vision impairment ranging from mildly impaired to very severely impaired. Many reasons can cause vision impairment or blindness, such as diseases and accidents. People with vision impairment are not able to rely on their vision to perform recreational, vocational, and social tasks (WA, 2015). The table below provides more details:

Table 1: Vision impairment definition ((Chapman, 2001, pp. 15–19)

Visual disability Scale	Type	Ability
20/25–20/65	Subnormal vision	• Driving • Reading • Excellent travel vision • Excellent object vision

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20/70	Mildly impaired	• Magnifier for reading • Telescope glass for driving • Good travel and object vision
20/75–20/200	Moderately impaired	• Poor object vision • Good field vision • Use of LV aids • Telescope glass for driving
20/200–20/800	Seriously impaired	• Reading with LV aids • Cannot drive • Object vision is very poor • Travel vision is acceptable (but not for the lower end of this scale)
20/800–20/1200	Severely impaired	• Loss of travel vision • Object vision is poor or • Very strong magnifiers are used to read large print
20/1200–20/6000	Very severely impaired	• Using a white cane or a guide dog for travel • Slight object vision with light perception

Table 2: Cause of vision loss (Chapman, *2001, pp. 74–108)*

Cause of vision loss	Effect on sight	Treatment	Sight condition
Cataract	Gradual clouding of the lens or an area of the lens	Corrected by glasses, lenses, or surgery	**Figure 2: Cataract** 
Diabetic Retinopathy	Affects both central and peripheral vision	Treat diabetes (the cause of diabetic retinopathy)	**Figure 3: Diabetic Retinopathy** 
Glaucoma	Glaucoma destroys the The peripheral vision	Medication and surgery	**Figure 4: Glaucoma** 
Macular Degeneration (MD)	Many diseases affect the maculae and cause central vision loss, but they never blind the person;	Research is in process	**Figure 5: Macular Degeneration** 

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Retinitis Pigmentosa (RP)	A gradual loss of light-sensing cells caused by mutations of certain genes, which send faulty signals to the retinal cells	No treatment; RP coping skills are centered around providing more light and to be focused light	**Figure 6: Retinitis Pigmentosa** 

II. PURPOSE OF THE STUDY

People of all ages can be affected by vision loss. They will face difficulties in carrying out daily activities as a result of their low vision. Low vision can develop from injuries, inherited diseases, Glaucoma, cataracts, diabetes, and retinal diseases. Moreover, many older people experience vision impairment as it is related to age diseases. The purpose of this paper is to keep people with vision impairment connected to the world and to break their isolation and separation. In addition, it will offer strategies, techniques, and a variety of technological products that will help anyone with vision impairment operate and maximize their level of independence.

III. COPING WITH VISION LOSS

Individuals with VI could use certain techniques to help them complete their daily activities. These techniques are actually effective even for sighted persons:

- Get closer to the viewed object.
- Eccentric viewing is 100% helpful for individuals with MD and moderately effective for those with cataracts or diabetic retinopathy.
- Scanning is 100% effective for individuals with RP, glaucoma, and diabetic retinopathy. It is also highly effective for individuals with cataracts and MD.
- Proper use of light is 100% effective for anyone with the five different diseases.
- Contrast enhancement helps everyone see things better. Yellow, amber, and reddish amber enhance contrasts and visual ability (Chapman, 2001, pp. 110-135).

Vision Impairment and Sensory Compensation:

People rely on their different senses to understand and experience their environments. One of neuroscience's important findings is that vision impairment and vision loss sharpen the other senses (especially hearing and touch) in order to cope with the loss of sight (Catteneo & Vecchi, 2011, p. 11).

Hearing: One of the most important auditory experiences is sound localization, which is how sound is spatially located in three different dimensions: elevation, range, and azimuth.

Despres, Candas, and Dufour (2005b) performed an experiment with 20 blindfolded-sighted, 24 myopic, 5 amblyopic, 11 adventitiously blind, and 9 congenitally blind subjects to determine how they oriented themselves according to auditory cues. Individuals who had the most vision loss (blind) were more accurate in positioning themselves compared to sighted and VI subjects, but the early blind subjects made smaller errors in positioning themselves compared to late-blind subjects. Late-blind, myopic, and amblyopic subjects were significantly better in orienting themselves in the space compared to normally sighted individuals. As a result, intersensory compensation is likely to be weaker for VI individuals compared to blind individuals and stronger compared to normally sighted individuals. Moreover, VI individuals are considered worse than blind people in building spatial maps for their environment on the basis of auditory cues because their auditory maps are built in support with their vision, which may have caused some confusion and inaccuracy (Cattaneo & Vecchi, 2011, pp. 138–141).

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Tactile ability: Tactile acuity has been measured for VI individuals compared to blind and sighted individuals. According to the test by Goldreich and Kanic (2003), a heterogeneous group of blind people with different degrees of blindness were tested; VI individuals performed similarly to blind individuals and better than sighted individuals.

All tests suggest that severe visual impairment may result in auditory and tactile acuity gains; however, in some specific situations (such as auditory localization), the brain sometimes relies on visual input over other senses (as opposed to VI individuals), and this may cause confusion and errors (Cattaneo & Vecchi, Sensory compensation, 2011, pp. 140-141).

Spatial cognition for LV individuals: Spatial cognition for VI individuals is considered to be limited, but still, they can build a visual representation of the environment in which they are familiar. Some experiments have tested the spatial abilities for VI individuals compared to sighted and blind individuals. These experiments found that VI individuals are similar to sighted people in building their spatial knowledge of their environments whereas blind individuals face difficulties, especially when the tasks are related to moving in straight lines; they build their understanding of the space, objects, and the environment through auditory and haptic information. This information helps VI individuals build analogical representations that they use to cope with everyday situations. Blind individuals are able to translate visually missing information into other sensory and cognitive codes. Blindness is not less vision; rather, it is another form of vision (Cattaneo & Vecchi, Spatial cognition, 2011).

Assistive Tools for Low-Vision People:

Assistive tools or LV aids are objects that help people with LV do their daily tasks independently.

Optical aids

- Magnifying spectacles: there are two types of magnifying spectacles. The first has varying power and does not need a doctor's prescription. The second is ordered for each patient depending on the need.
- Telescope glasses: regular spectacles with a telescope lens
- Head-borne magnifier
- Handheld magnifier
- Stand magnifiers/lighted stand magnifiers
- Telescope aids: these aids are used to view objects at a distance (Chapman, 2001, pp. 139-157).

Table 3: Optical aids

				
Figure 7: Telescope glasses	**Figure 8:** Head-borne magnifier	**Figure 9:** Handheld magnifier	**Figure 10:** Stand magnifier	**Figure 11:** Telescope aid

Video visual aid:

A video visual aid is an assistive tool that helps LV and blind people read and write, even if these individuals do not have object or travel vision. This tool is useful for the VI who rank 20/800 and lower on the visual disability scale.

Table 4: Video visual aid as an assistive tool (Chapman, 2001, pp. 167-171) Aids for computer users, reading aids, and voice aids

Disease	Cataracts	Diabetic retinopathy	Glaucoma	MD	RP
Usefulness (Scale 1–10)	10	10	7–9	10	7–9

Special software is used to enlarge prints and graphics to 2" or 3" tall, and other software convert text to electronic speech (Chapman, 2001, pp. 172-175).

Table 5: Special software as assistive tools

Disease	Cataracts	Diabetic retinopathy	Glaucoma	MD	RP
Usefulness (Scale 1–10)	10	10	7–9	10	7–9

Special aids for field loss:

Vision expanders: The vision expander provides a wider field of vision and helps people with glaucoma and retinitis who develop tunnel vision.

Table 6: Special aids for field loss

Disease	Cataracts	Diabetic retinopathy	Glaucoma	MD	RP
Usefulness (Scale 1–10)	1	1	8–10	1	8–10

Night scopes: Night scopes help those with night blindness (such as those with RP) to see everything in hues of green (Chapman, 2001, pp. 176-179).

Mobility devices:

- Laser canes can detect hazards and obstacles within 12 feet of the cane. The cane's handle also vibrates when an object is in front of the user.
- Sonic mobility devices are mounted over the users' heads and detect any hazards or objects with vibrations; this device is mostly used in outdoor environments.
- GPS devices helps blind individuals travel in outdoor environments by identifying locations and routes (Julius, 2010).

This literature review discussed the different types of vision impairment and how people with vison impairment cope with their vision loss using assistive tools and their other senses such as hearing and touch. The findings in this review suggests that the world of vision impairment is as rich as the world of sighted people or even more. The surrounding environment is usually designed for visual experience, yet the VI people are able to use their other senses to translate the missing visual experience into other sensory and cognitive codes. Vision impairment is not less of vision; it is another way of visualizing things.

IV. CONCLUSION

This paper has discussed the different forms of vision impairment and how these impairments affect perceptual and cognitive abilities. Moreover, it presented how vision loss sharpens the other senses, especially the hearing and tactile faculties, to help visually impaired people to cope with their vision loss. Assistive products offer new ways to help VI individuals maintain their current activities and to fulfil their life goals. New assistive technology will continue to be developed to help people with VI enhance their everyday life.

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