Rehabilitation Strategies for Vision Disorders Secondary to Stroke

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Most common vision problems secondary to stroke

- Visual field loss (54%)
- Ocular motor disorders (49%)
- Binocular vision disorders (87%)
- Strabismus (57%)
- Extra-ocular muscle palsy (14%)
- De-compensation
Vision Disorders in a Stroke Population

Categories of Disorders

- Binocularity
- Ocular Motor
- Strabismus
- Visual Field Loss
- EOM Paralysis
- No vision loss
- All Impairments

Number of patients
Visual Field Loss

- Inability to identify or localize a target in a specific area of the visual field.
- Loss is consistent with area of brain affected by stroke.
- Typically the patient can see the loss – they describe things missing in their field of view or a blank area.
Ocular motor disorders

- Inability to fixate.
- Poor tracking and pursuits.
- Loss of scanning patterns; poorly organized saccades.
- Interferes with attention, form perception, figure-ground and reading.
Binocular vision disorders.

- Double vision.
- Suppression.
- Convergence insufficiency/convergence excess.
- Poor spatial perceptions, cannot localize accurately, interferes with information processing.
Strabismus

- May be secondary to stroke or a de-compensation.
- Usually sudden onset.
- May self resolve quickly. The longer the symptoms last, the less likely to spontaneously resolve because the patient will start to compensate.
Extra-ocular muscle palsy.

- Very disruptive in most cases.
- Causes strabismus and diplopia.
- Can be field specific, limiting the effectiveness of lens or surgical correction.
- Response to physical therapy comparable to overall patient response.
De-compensation syndromes.

- Manifestation of previously existing condition that may not have been diagnosed.
- Highly disruptive to patient.
- Due to other neuro-motor weakness they are no longer able to compensate.
It is important to understand the impact of post-stroke vision disorders on rehabilitation. In addition to those listed above, there are other vision problems that will impact recovery.
Visual processing disorders. These include speed and span of perception, figure ground, visual memory, visual-auditory integration and visual spatial perception. Among the problems manifested will be poor depth perception and an inability to localize objects or self in space. Directionality and laterality can be impaired.
Post-trauma vision syndrome.

This is a complex syndrome involving loss of integration of visual information. It affects ambient processing and is not readily diagnosed through traditional vision exams that evaluate the focal system only. Post trauma vision syndrome can be alleviated with treatment of the underlying vision disorders.
Symptoms of post-trauma vision syndrome can mimic psychiatric symptoms.

Interesting symptoms are sometimes reported, such as attempting to walk on a floor that appears tilted and having significant difficulties with balance and spatial orientation when in crowded or moving environments. Patterns on floors and walls can be disorienting.
These type of symptoms are not uncommon. Frequently, persons reporting these symptoms to eye care professionals (optometrists and ophthalmologists) have been told that their problems are not in their eyes and that their eyes appear to be healthy. Patients may complain of physical discomfort and may develop associated anxiety disorders.
### Characteristics and symptoms of Post-Trauma Vision Syndrome

<table>
<thead>
<tr>
<th>Common Characteristics</th>
<th>Common Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exotropia</td>
<td>Diplopia</td>
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<tr>
<td>Exophoria</td>
<td>Blurred near vision</td>
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<tr>
<td>Convergence Insufficiency</td>
<td>Perceived movement of print or stationary objects</td>
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<tr>
<td>Accommodative disorder</td>
<td>Asthenopia</td>
</tr>
<tr>
<td>Oculomotor Dysfunction</td>
<td>Headaches</td>
</tr>
<tr>
<td>Increased Myopia</td>
<td>Photophobia</td>
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</tbody>
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Visual-midline shift syndrome.

- Easily diagnosed in screening.
- Affects balance and mobility.
- Can be corrected with lenses or therapy.
VISUAL MIDLINE SHIFT TEST

Normal Response
VISUAL MIDLINE SHIFT TEST

Visual Midline Shift To Right
VISUAL MIDLINE SHIFT TEST

Posterior Shift of Visual Midline
Posterior Visual Midline Shift
VISUAL MIDLINE SHIFT TEST

Anterior Shift of Visual Midline
Anterior Visual Midline Shift
Balance and gait anomalies are generally diagnosed and treated with physical therapy and vestibular therapy. Vision disorders affecting depth perception and spatial judgments will impair the patient’s visual guidance system and disrupt locomotion. These problems need to be diagnosed and corrected before the patient can regain stability.
Maladaptive postures.

- Patients with visual field loss will typically adjust their posture towards the field of loss, increasing their forward gaze.
- Patients with neglect are more likely to turn away from the affected field, increasing the impact of the disorder.
Maladaptive postures.

- Inferior field cuts are often compensated by leaning forward and superior loss by tilting the head up and leaning back.
- All of these postures will increase the risk of falling.
- Patients with ocular motor disorders will turn in a direction that increases their functional field and reduces the impact of the palsy or paralysis.
Immediate intervention strategies

Patching is the most common treatment for binocular vision disorders after stroke. Occluding an eye has the secondary effect of reducing the patient’s visual field and eliminating all binocular cues to depth perception. Patching is much more affective if used in a specific, limited way that maximizes the patient’s field of view.
Binasal occlusion reduces the overlapping visual field and minimizes diplopia, without removing peripheral vision on either side and impairing mobility. It also stimulates convergence. It can be balanced or moved towards the affected eye.
Bi-nasal occlusion
Limitations of lens treatment

- Lenses will change as the patient’s vision changes.
- Insurance usually does not pay for therapeutic lens prescriptions.
- Glasses limit peripheral vision.
- Lenses that improve sight or eye alignment will also distort space.
- Multifocal lenses can impair balance.
Use of the patient's own lenses

- Does the patient habitually wear corrective lenses?
- When should they be worn?
- How old is the correction?
- Is the patient unable to use glasses?
- Is the patient’s vision adequate for optimal participation in therapy?
It is important to understand the long term goals of vision rehabilitation and quality of life (Q.O.L.) implications. Rehabilitation goals may differ from short term correction or palliative intervention. Long term goals must address not only ADLs, but improve independent function and mobility.
Know when and how to refer to a specialist for vision evaluation and intervention.

- Start with a vision screening.
- Understand who to refer to.
- Know what type of feedback and intervention strategies to expect.
- What is the expected outcome of vision rehabilitation?
- Does the patient understand their present limitations and the prognosis?
Vision Screening

- Does the patient have a history of eye or vision problems? Does the patient have a refractive correction?
- What symptoms is the patient having?
- Pupil reflexes.
- Confrontation fields.
- Physiological H.
- Convergence.
- Red lens test.
Basic ocular motor therapy

- The best therapies will require a motor response from the patient.
- Visually following a target is inadequate. The patient should follow with a finger as well as with the eyes.
- Swinging ring, Marsden ball and Belgau toss are recommended.
Binocular vision disorders

- Anisometropia must be corrected, and the eyes must be grossly aligned.
- Near-point correction should be worn.
- Anaglyphic procedures include tracing at near and tracking at far.
- Brock string or rule.
Improving visual field

- Start from the central field with best vision and work out in both directions.
- Encourage visual-motor activities across midline.
- Use moving targets to stimulate ambient awareness.
- Do not work from the blind area in.
“Vision is our dominant sense. … (it) is the process of deriving meaning from what is seen. It is a complex, learned and developed set of functions that involve a multitude of skills. Research estimates that eighty to eighty five percent of our perception, learning, cognition and activities are mediated through vision.”

Introduction to Vision & Brain Injury
Thomas Politzer, O.D. NORA (www.nora.cc)
“The ultimate purpose of the visual process is to arrive at an appropriate motor, and/or cognitive response. There is an extremely high incidence (greater than 50%) of visual and visual-cognitive disorders in neurologically impaired patients (traumatic brain injury, cerebral vascular accidents, multiple sclerosis etc.)"

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