

VISUAL FIELD LOSS VS VISUAL NEGLECT. ABNORMAL EGOCENTRIC LOCALIZATION

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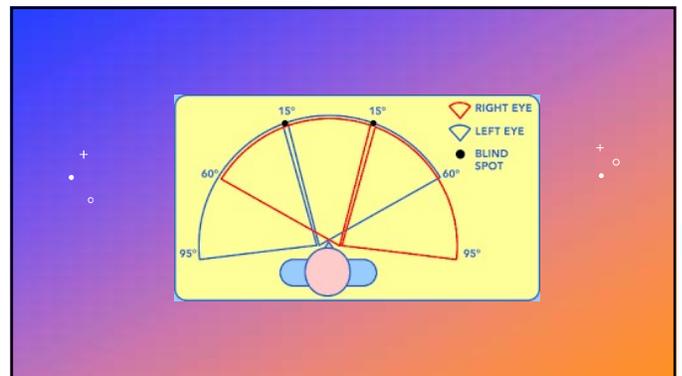
2023 STUDY GROUP WEBSITE

www.denvert.com/co_study_group_2023/

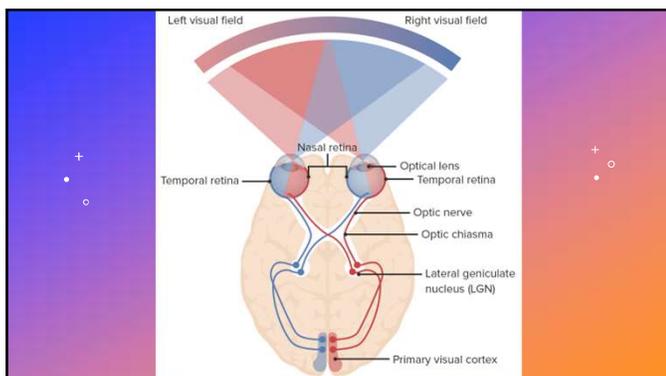
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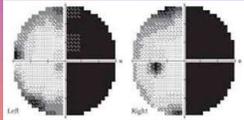
What and where pathways

Where Pathway (Parietal lobe, magnocellular pathway) = Spatial attention, direction. Processing of motion.

WHAT pathway (Temporal lobe, parvocellular pathway) = Identification of objects, colors, faces, central detail

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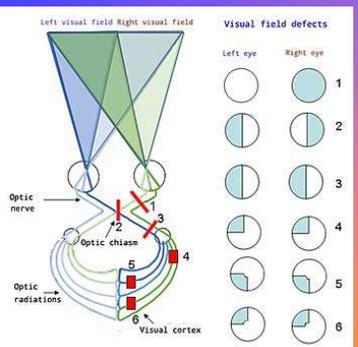
VISUAL FIELD DEFECTS



Definition: an area of visual field loss (scotoma) or blind area within the normal field of one or both eyes.

In most cases the areas of visual field loss are persistent, but in some instances, they may be temporary and shifting, as in migraine headaches.

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Visual field defects

Left eye	Right eye

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VISUAL FIELD DEFECTS

Causes of visual field defects are numerous and include:

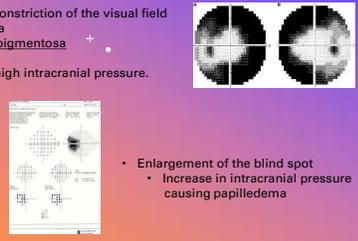
- glaucoma
- vascular disease
- tumors
- retinal disease
- hereditary disease
- optic neuritis and other inflammatory processes
- nutritional deficiencies
- toxins
- drugs
- **TBI (traumatic brain injury)**
- **acquired brain injury such as stroke**



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FIELD DEFECTS CAN HELP LOCALIZE WHERE THE INSULT IS LOCATED IN THE BRAIN

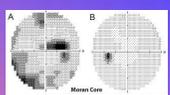
- Generalized constriction of the visual field
 - Glaucoma
 - Retinitis pigmentosa
 - Hysteria
 - Chronic high intracranial pressure.
- Enlargement of the blind spot
 - Increase in intracranial pressure causing papilledema



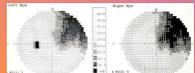
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FIELD DEFECTS CAN HELP LOCALIZE WHERE THE INSULT IS LOCATED IN THE BRAIN

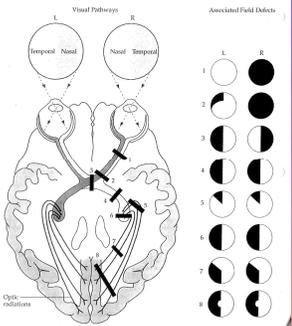
When defects occur in the visual field of only one eye, the cause can be localized to the eye or to anterior visual pathways (before the two optic nerves meet at the optic chiasm).



Defects that involve the visual fields of both eyes often (but not always, as in the case of glaucoma) reflect disease processes at the optic chiasm or farther back in the brain.



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The extent and the location of the blind areas in the visual fields may provide further clues concerning the location of the lesion responsible.

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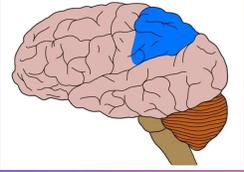
VISUAL SPATIAL INATTENTION (NEGLECT)

- Also known as Unilateral Spatial Inattention or Hemi-spatial neglect
- A common occurrence after stroke
- Also occurs subsequent to traumatic brain injury.
- Can also be found in neurodegenerative disease, such as Alzheimer's disease
- Major consequence - the patient is unaware of one side of their body, and/or one side of visual space.
- Most commonly, damage occurs in the posterior parietal cortex and the temporo-parietal junction.
- The most common cause is a middle cerebral artery cerebral vascular accident.

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VISUAL SPATIAL INATTENTION (NEGLECT)

'Insult to the right inferior (posterior) parietal cortex is the structure that is virtually always involved, although other brain areas have been implicated.'

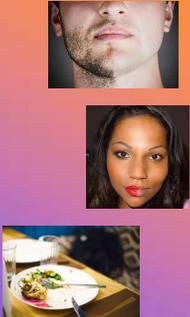


A primer for the optometric management of unilateral spatial inattention
 Irwin B Suchoff 1, Kenneth J Giuffreda
 Optometry, 2004 May;75(5):305-18.

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EXAMPLES IN PATIENTS:

- Personal space: Affects awareness of body
 - Will only shave one side of face
 - Will only apply makeup to one side of face
- Peri-personal space (within arms reach)
 - Will only eat the food on one side of the plate
- Dr. Suter tells of a patient who, when asked to walk to his wife at the other end of a hallway, he walked directly to her until he got within arms' reach and then would suddenly veer to the side so that she ended up on his right. When asked why, he had no idea he was doing it.



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EXAMPLES IN PATIENTS:

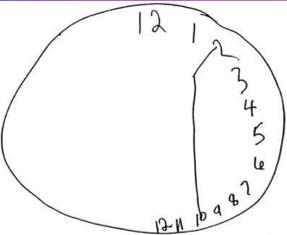
- Extra personal space (beyond arms reach)
 - When speaking to someone, the patient will direct responses toward their "good side" even though no one is there.
- In the examination room, head injury patients who skip the first letter of the row when reading the distance or near eye charts should be suspects of neglect.
- Patients who show any sort of visual field loss or evidence of broad functional difficulties with navigation, reading or generalized confusion about their surroundings following brain injury may be patients with visual spatial inattention

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TESTS FOR VISUAL SPATIAL INATTENTION

Clock drawing test

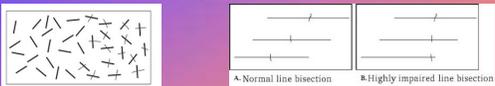
- Right-brain-damaged individuals with spatial neglect often depict an object with left-sided features absent.
- The circular outline is rarely compromised and is almost always the first feature produced in the task.



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TESTS FOR VISUAL SPATIAL INATTENTION

Line Bisection Test – two types

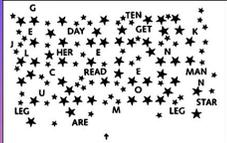


Line bisection tests require people to estimate and indicate the midpoint of a horizontal line presented on a piece of paper placed in front of them. The line is usually centered with respect to the patient's midline, and a mark is made with a pencil in the preferred or unaffected hand.

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TESTS FOR VISUAL SPATIAL INATTENTION

Cancellation Tests



There are 52 large stars, 13 letters, and 10 short words interspersed with 56 smaller stars. The patient must cross out with a pencil all the small stars on an 8.5" x 11" piece of paper. Two small stars in the center are used for demonstration. The page is placed at the patient's midline.

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NEGLECT VS. HEMIANOPSIA

Criteria	Visual Neglect	Homonymous Hemianopsia
Visual behavior	Lack of attention in contralateral hemispace, independent of the direction of gaze	Loss of visual field of contralateral hemispace, with respect to the position of the head and eyes.
Awareness of deficit	Usually unaware of own deficit	Usually retains awareness to a certain extent
Location of lesion	Usually within the territory of the middle cerebral artery (MCA)	Usually within the territory of the posterior cerebral artery (PCA)
Uni- vs. multimodal deficits	May associate with other modalities, like auditory, tactile and motor	Strictly confined to visual modality
Extinction	Frequently associated	Less commonly associated
Drawing from memory	Commonly leave out the details on the affected hemispace	Normal and symmetrical
Visual spatial disorder	More commonly affected	Usually not affected
Line bisection	Ipsilesional deviation	Usually contralateral deviation
Attentional cueing strategies	Presence of cueing may ameliorate neglect (usually transiently)	Presence of cueing does not modulate the disorder
Specific perimetric techniques	Difficulty in maintaining central fixation	Good control of central fixation
VEP and eye movement registration	Near normal on both sides but prolonged latency may be demonstrated on the affected side	Marked disparity between the normal and affected hemifield

This table is from Kerkhoff and Shindler: Neurology and Psychiatry 2000:68

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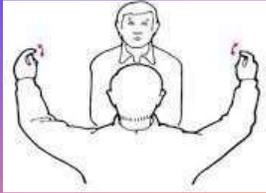
DEFINITION OF VISUAL EXTINCTION

- Visual Extinction is a form of visual neglect in which a previously visible stimulus in one half of the visual field is not consciously reported when a second stimulus appears simultaneously in the other half of the visual field.
- Visual extinction occurs as a result of unilateral brain damage, usually to the parieto-occipital cortex contralateral to the visual field in which the extinction occurs. (from the American Psychological Association Dictionary of Psychology)
- Extinction is apparent only when 2 stimuli compete for the subject's attention.

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TESTING FOR VISUAL EXTINCTION

The double simultaneous confrontation test.



An implicit assumption of this diagnostic test is the notion that extinction is most severe when both stimuli are presented precisely simultaneously.

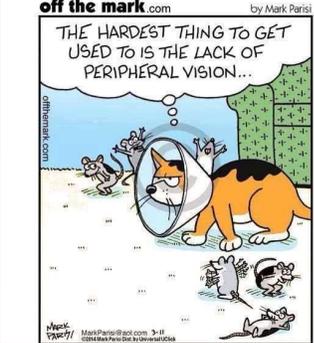
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VISUAL FIELD LOSS VS NEGLECT

Which has the worse functional prognosis?

Can you have both Visual Field Loss and Neglect on the same side?

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off the mark.com by Mark Parisi

THE HARDEST THING TO GET USED TO IS THE LACK OF PERIPHERAL VISION...

Mark Parisi @ offthemark.com 3-11
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VISUAL MIDLINE SHIFT SYNDROME

AKA
Abnormal Egocentric
Localization

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VISUAL MIDLINE SHIFT SYNDROME (VMSS)

DEFINITION: A shift in a person's concept of where their midline is relative to physiological midline. The prevalence of VMSS is extremely high in TBI patients.

VMSS can occur on the horizontal midline (X axis), the vertical midline (Y axis), anteriorly or posteriorly (Z axis)

This shift can affect posture in the following ways – figures from



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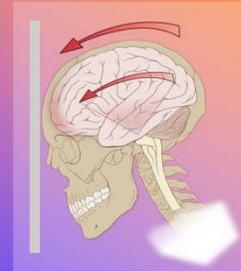
Symptoms of VMSS

Floor may appear tilted	Walls and/or floor may appear to shift and move
Veering during mobility, sense of drifting while walking	Person leans away from the affected side
Poor or altered posture (see figures in last slide)	Poor or reduced balance
Feelings of imbalance or disorientation similar to vertigo	Spatial disorientation in complex visual environments

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VISUAL MIDLINE SHIFT SYNDROME (VMSS)

- Location of injury?
 - Likely parietal (magno pathway)



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Testing for VISUAL MIDLINE SHIFT SYNDROME

- Performed with the patient standing with the head and body straight with both eyes open
- Uncorrected refractive error and reduced visual acuities are not likely factors that affect VMSS testing unless the visual acuities are worse than 20/1000.
- Examiner stands in front and off to the right side of the patient (so that the patient will not use the examiner's face and nose as a point of reference for midline).
- The target is a Wolff Wand fixation target (a silver-colored spherical metallic ball half an inch in diameter mounted on a metallic wand) held about 16 inches away from the patient's face at eye level and moved at a speed of approximately 5 inches per second.
- The patient is instructed to follow the horizontally-moving target with their eyes without moving their head and inform the examiner when the target appears to be directly in front of their nose or in the middle.
- The test is then repeated from the other direction. The reason for repeating the test in the other direction is to ensure consistency of the response (i.e. VMSS is not due to the patient's slow verbal response).

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Testing for VISUAL MIDLINE SHIFT SYNDROME

- After obtaining the horizontal midline point in primary gaze, perform the test in down gaze (while following the moving target from left to right and then right to left viewing approximately 45 degrees below eye level). Finally, perform the test in up gaze (while following the moving target from left to right and then right to left viewing approximately 45 degrees above eye level).
- Next, the examiner positions himself/herself below the patient's eye level (so that the patient will not use the examiner's face/nose as a point of reference).
- The patient is now instructed to follow a vertically moving target from superior to inferior without moving their head and report when it reaches eye level. Repeat, moving the target from inferior to superior, having the patient report when it is at eye level.
- After obtaining the vertical midline point in primary gaze, repeat the test to obtain the vertical midline point in right gaze (while following the moving target from superiorly to inferiorly and back viewing approximately 45 degrees to the right). Finally, repeat the test to obtain the vertical midline point in left gaze (while following the moving target from superiorly to inferiorly and back viewing approximately 45 degrees to the left).

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Testing for VISUAL MIDLINE SHIFT SYNDROME SUMMARY

- With eyes open and sitting straight, patient holds target in dominant hand and passes it in front of them, stopping at their perceived midline
- Cross over midline and come back to center
- Repeat in upgaze and downgaze
- Repeat test with eyes closed
- Can also repeat for vertical midline

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Other Observations in VMSS

- Often patients are negatively impacted by motion on the side of poor attention
- For example, a patient with a right visual midline shift will have more difficulty processing movement in their left field
- Testing with OKN drum can quantify their motion sensitivity



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Treatment for VMSS

- **Binasal tape** (sometimes asymmetrical, with wider tape on the side of poor attention)
- **Yoked Prism** prescription in glasses – trial frame thoroughly, and educate that prescription may change
- **Neuro-optometric rehabilitation** with peripheral awareness activities and crossing midline

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BREAK

Then we will return and have discussion about possible treatments and therapies for the different conditions we've discussed so far.

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THANK YOU

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