

## Unilateral Spatial Inattention (USI) - Cathy Stern, OD, FCOVD, FCSO, FNORA

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### Terminology

- Unilateral Spatial Inattention (USI)
- Visual Neglect
- Spatial Neglect
- Hemispatial Neglect
- Hemi-Inattention
- Visuospatial Neglect
- Visuospatial Agnosia

### Disorders of Visual Attention

- Visual Field deficit
- Visual Spatial Inattention (visual neglect)
  - It is a visual spatial inattention
    - not purposely neglecting the space
  - Most often seen as failure to orient and respond to stimuli presented in space contra-lateral to the side of the lesion
  - Typically in left visual field / space

### Visual Spatial Inattention

- Body (personal) space
  - Do not groom left side
- Reaching (peri-personal) space
  - Difficulty locating objects within arms reach
- Far (extra-personal) space
  - Difficult describing distance objects

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### Examples of Inattention

- Personal Space
  - ask the patient to mime combing her hair or ask him to mime shaving his face
- Peri-personal Space (reaching)
  - ask the patient to name 10 objects from a group scattered on a table in front of them
- Extra-personal space (far)
  - have the patient walk to a straight ahead target 10 feet away

### Anosognosia

- Lack of self awareness of the deficit
- The patient is unaware that they have had a stroke and have paralysis of the left side
- Patient may not seek medical aid or rehabilitation and may not take medications

### Extinction

- Extinction
  - Can see an object when one side is stimulated
  - Will fail to see the same object when both fields are simultaneously stimulated.
  - Can be in more than one sensory modality
    - Vision – 2 objects presented simultaneously in opposite visual fields
    - Touch – 2 point touch

### Eye Movements During Search



Figure 1. Measurement of the eye-movements during search for letter 'h' among 'a' of a typical patient with left neglect reveals a tendency to repeatedly fixate items on the right while ignoring those on the left.

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### Tests for Visual Spatial Inattention

- Line Bisection
  - Shift toward side of the lesion
  - Patient essentially bisecting a shorter line
  - Shift of visual space (midline shift)

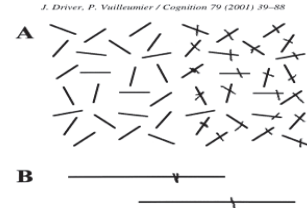
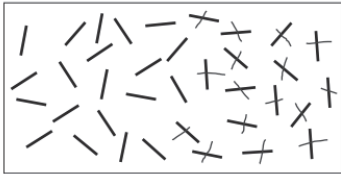
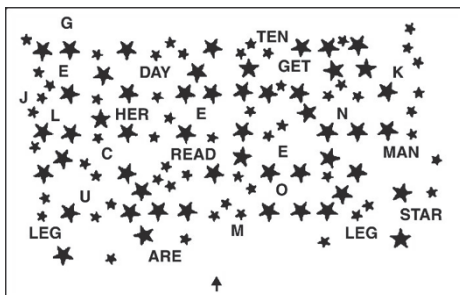


Fig. 1. Examples of deficits found in patients with left spatial neglect on typical clinical tasks. (A) Line cancellation task. The patient has to mark each of many small lines that are spread out on a sheet of paper presented in front of them. Typically, the patient fails to detect some lines on the contralateral side, even when given considerable time to complete the task. More sensitive cancellation tasks may involve the marking of a target letter or shape among distractors. (B) Line bisection task. The patient is asked to mark the midpoint of long horizontal lines and deviates towards the right ipsilesional side, as if neglecting the left contralateral extent. Such an ipsilesional bias is often greater when the lines are positioned more to the left side. It can be partly alleviated when the patient is cued to the contralateral end of the line, for

### Cancellation



Cross out all the small stars

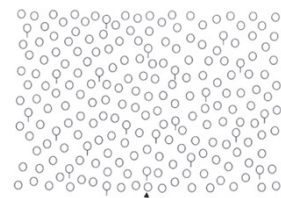
### Balloon Test

This test is sensitive to unilateral neglect. Useful when patient is compensating but still has deficits.

**Pop out** – balloons are circles with strings attached

**Active Search** – find circles with the array of balloons

Pop out – More errors on the top task means neglect figures into the deficit (left visual field loss should be about the same because the targets are visually similar)



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### Copying Figures



### Behavioral Inattention Test (BIT)

- BIT Conventional subtest (BITC) consists of 6 items:

- Line crossing
- Letter cancellation
- Star cancellation
- Figure and shape copying
- Line bisection
- Representational drawing

- BIT Behavioral subtest (BITB) consists of 9 items:

- Pre-scanning
- Phone dialing
- Menu reading
- Article reading
- Telling and setting the time
- Coin sorting
- Address and sentence copying
- Map navigation
- Card sorting

- Maximum scores:

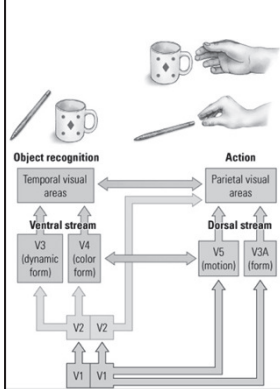
◦ BIT = 227

◦ BITC = 146

◦ BITB = 81

- Higher scores are indicative of more severe visual impairment

### Anatomy of Neglect



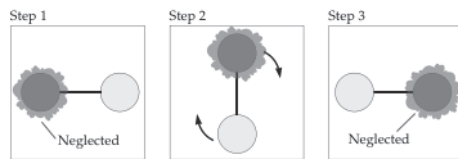
- Contralateral Neglect
  - Neglect for visual, auditory, and somesthetic stimulation on one side of the body or space
  - Lesion most often in the right inferior parietal lobe
    - Right intraparietal sulcus and the right angular gyrus
  - Defective sensation or perception
  - Defective attention or orientation

### Cognitive Deficits

- With directing attention to the left
  - bias toward the right side
  - “extinction” – object on the right side “wins” over the object on the left side
  - Problem disengaging attention and shifting attention especially leftward
- Impaired representation of space
- Directional motor impairment

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### Non-Spatially Lateralized Deficits



Bias is to the object

Other examples:  
Sustained attention  
Slow visual processing (but slower on the left side)

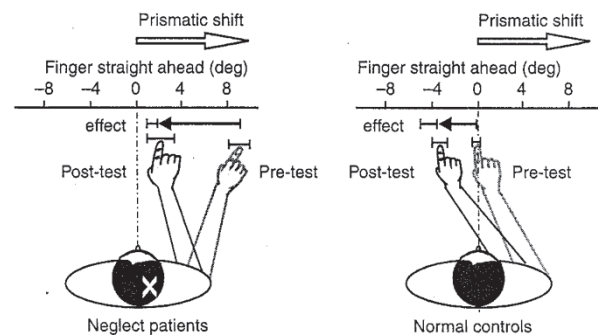
### Treatment

- Compensatory
  - Encourage scanning to the left side
    - Not very successful because the patient is unaware of the deficit
- Behavioral
  - Prism Adaptation
    - induce rightward horizontal displacement of visual field

### Prism Adaptation (PAT)

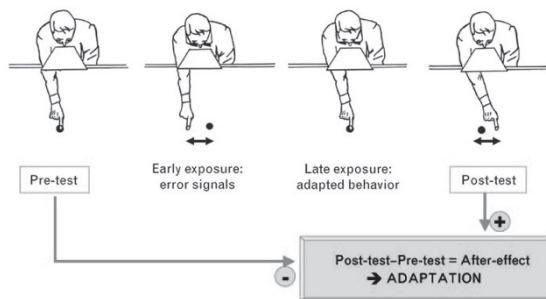
- Most PAT treatments use Base Left, and include motor pointing tasks, 50 reps-10deg prism
- Becomes bimodal vs unimodal treatment
- Rossetti (1998) found it lasted 2 hours vs. 10-12 min with caloric, cervical or OKN stimulation
- Explanation:
  - Compression in neglect
    - likely expansion using prism base left
  - Also:
    - Included active reaching so localizing spatially with hands
    - using left hand and may including limb activation

### Rossetti 1989 study on yoked prism



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### Pretest to Posttest Pointing with PAT



### Case Presentation

- Pre treatment observations
- Therapeutic Treatment/Vision Rehabilitation
  - office based
  - home based
- Progress Evaluation
- How do you document treatment success?

### Quick Progress Assessment Tools

- Patient and Family Feedback
- Ask about ADL's
- Patient performance for in office procedures  
e.g. space fixator, puzzles, word search, etc.
- Oculomotor testing
- Confrontation Visual Field (with opportunity for extinction)
- Line Bisection or Copying a Drawing

### Success

