# Clinical research- clinical care (CRCC) spatial neglect partnership program

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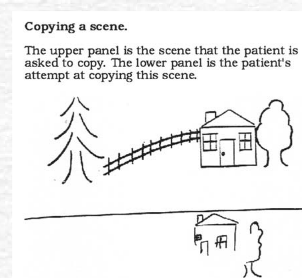
## Introduction

Right hemisphere stroke may critically reduce the capability to perceive, internally represent, and act upon spatially-distributed, global information, as well as the ability to activate automatic visuospatial response systems. Spatial neglect has traditionally been defined as a failure to respond, report, or orient to stimuli in space contralateral to a brain lesion (Heilman et.al.1979) and now is defined as associated with functional deficits (Barrett and Berkholder, 2006) and daily life problems such as difficulty eating and reading (Katz et al. 1999) (Paolucci et al.2001).

## Purpose/Background

Stroke causes disabling spatial bias (spatial neglect) in > 30% of acute survivors. Because spatial neglect is associated with longer average length of hospital stay (Gillen et al., 2005; Katz et al., 1999), increased family burden (Buxbaum et al., 2004) and higher requirements for assistance (Rundek et al., 2000), an additional $1,000 increase per person is estimated. This then results in the total estimated US cost of > $200 million annually.(Reistra & Barrett, in press). In Europe, this burden is addressed via clinical care-research collaborations organizing systematic neglect treatment, which make emerging research therapies available. After a recent Cochrane review (Bowen & Lincoln, 2007) called for improved functional-based assessment in spatial neglect therapy and research, the Kessler Institute for Rehabilitation partnered with the Kessler Foundation Research Center to improve neglect assessment and care planning as well as collect research treatment outcomes.



## Objectives

To assess spatial functional improvement using the Catherine Bergego Scale (CBS), (CBS; Azouzi et. al., 2003) stroke survivors with spatial neglect enrolled in a pilot prism adaptation therapy program, part of a NIH-funded study on neglect recovery predictors. The CBS is a scale based on direct observation of the participant's function. Our institution uses the following protocol: 1.the scale is to always be performed at the same time during the day, 2.if you are unable to observe the participant during the real situation (eating/grooming) one must recreate the task, 3.time the session, 4.use the instruction sheet to help determine score.

## Design/Methods

Nine right stroke survivors participated; 5 women and 4 males with spatial neglect. Average age was 67. Mean score on the Behavior Inattention Test (BIT) was 41 (Wilson et.al.,1987), which is a score in the "abnormal" range. The neuropsychological section of the BIT was used.

Participants completed the prism adaptation treatment per protocol beginning in September 2008 until June 2009. We trained CRCC partnership therapists to assess spatial functional abilities in all survivors as part of clinical care, testing research patients both before and after treatment, using the CBS as the measure.

The prism adaptation treatment consisted of participants completing repeated pointing for a 15 minute interval, while wearing optical prisms with shifting gaze of 12.5 degrees rightward. Specifically, the actual task required one to complete 60 line bisections, placed in a pseudorandomized fashion at either of the following three locations (left, right, center). The treatment was completed 4 times within 1 week. Additionally, participants participated in a pre and post-prism proprioceptive and visual-proprioceptive tasks to set a base line and determine immediate aftereffects. (Keane, et.al., 2006).

The CBS training for the therapists consisted of clarifying how to administer each task properly and then arrive at the appropriate score. Specifically, we determined that for consistency, "formulas" were required to better strategize how to calculate the possible 0-3 score, as well as using a "guideline" to limit extraneous cuing and instructions for each item.

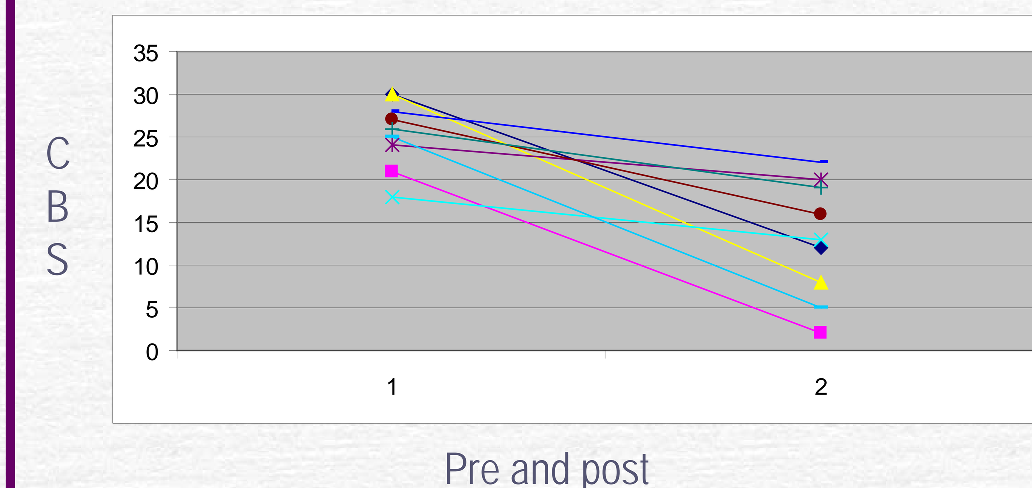
**BIT ranges from 0-146 with >129 being normal.
**CBS ranges from 0- 30.
Severe: 21-30, Moderate: 11-20, Mild: 0-10

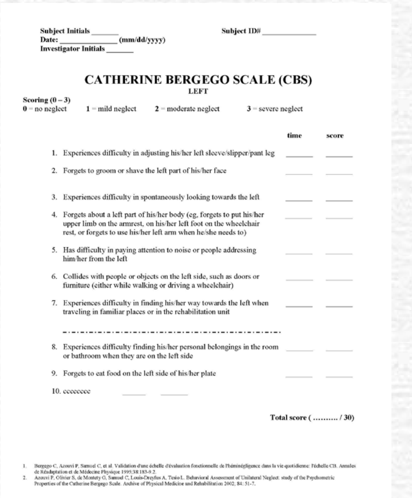
| Subject | Age | Gender | BIT before | CBS before | BIT after | CBS after |
|---|---|---|---|---|---|---|
| 1 | 64 | F | 28 | 30 | 54 | 12 |
| 2 | 35 | M | 112 | 21 | 109 | 2 |
| 3 | 79 | F | 11 | 30 | 73 | 8 |
| 4 | 73 | F | 86 | 18 | 129 | 13 |
| 5 | 84 | M | 24 | 24 | N/A | 20 |
| 6 | 68 | M | 14 | 27 | N/A | 16 |
| 7 | 70 | F | 31 | 26 | N/A | 19 |
| 8 | 78 | F | 56 | 28 | N/A | 22 |
| 9 | 51 | M | 130 | 25 | N/A | 5 |

*Table 1.* Nine right sided stroke participants with spatial neglect completed the protocol.

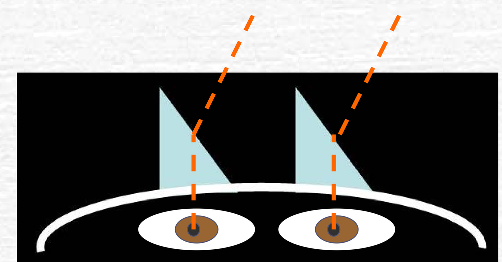
## Results

Mean CBS score improved after treatment; specifically the mean score before the treatment was 25/30 and the mean score after the treatment was 13/30. The t value = 5.14, p value <0.001. All treated participants improved specifically, scores improved from "severe" to "moderate" range (n= 4), from "severe" to "mild" range (n= 3) and within "severe" (1) and "moderate" range (1).




Please note: Lower number CBS score indicates better performance.



## Discussion/Conclusion

Spatial functional ability on the CBS, a tool useful for clinical evaluation and care planning, improved after participation in a CRCC pilot prism adaptation therapy program. Spontaneous recovery and individual characteristics cannot be separated from treatment effects in this analysis. Thus it is necessary to compare the results with subjects that received the protocol treatment to those who did not.

However, we demonstrated feasibility of developing a CRCC partnership for visual-spatial functional performance measures and spatial neglect research treatment. Not only has this improved practice expertise, this may result in improved research knowledge for both health care practitioners and research technicians. After completing a nation wide search to determine if other rehabilitation sites have a partnership program, we were unable to locate this type of collaboration for spatial neglect rehabilitation.

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