Sowmya Srinivas et al., J Clin Exp Ophthalmol 2016, 7:8 (Suppl)
http://dx.doi.org/10.4172/2155-9570.C1.045

Haptic-visual transfer in children with treatable congenital blindness

Sowmya Srinivas[1, 2, 3, 4], **Frank Thorn**[1], **Yuri Ostrovsky**[2] and **Pawan Sinha**[2]
[1]New England College of Optometry, USA
[2]Massachusetts Institute of Technology, USA
[3]Dartmouth Hitchcock Medical Center, USA
[4]Geisel School of Medicine, USA

Purpose: More than 300 years ago, Molyneux asked whether after a blind man regains his sight, can he, without touching a cube and globe be able to distinguish them purely by sight. According to a strict interpretation of the critical period, the brain is only plastic until 7 years and so visual improvement would not be expected after this age. A prior study (Held, 2009) demonstrated that newly sighted patients from underdeveloped villages in India who had their congenital cataracts removed showed little transfer from touch to vision immediately after sight onset. However, the link between touch and vision was acquired over time. The objective of the present study is to quantify this tactile-visual link in similar patients.

Methods: An object of a specific length, aspect ratio or curvature is handed to the patient who carefully touches it. Then, without touching, the patient is asked to visually identify the object among many others by pointing to it. Three patients were tested prior to and after treatment.

Results: The patient with the poorest pre-operational visual acuity showed the largest haptic-visual errors with an error range of 34-51%; the other patients had a range of 23-40%; the normal controls had errors of 1.2-10%. For all three patients there was a 25% improvement on post-operational day1 and by the day 4 there was a 50% improvement.

Conclusion: After cataract surgery, patients' estimation errors decreased by 50% in just four days. The link between touch and vision strengthened significantly after the classic critical period.

Biography

Sowmya Srinivas is an Optometrist at Dartmouth Hitchcock Medical Center and Instructor of Surgery at Geisel School of Medicine in Lebanon, NH. She has graduated from the New England College of Optometry and has obtained her Doctor of Optometry and Master's in Vision Science. She completed a Residency Program in Primary Care and Ocular Disease at the Veterans Affairs Hospital at White River Junction Vermont and was into Private Practice for a year upon completion of residency. She has pursued her Bachelor's degree in Neuroscience and has completed a two-year Research Fellowship in Immunogenetics.

srinivas.sowmya@gmail.com

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