Tactile-Visual Integration and Stereopsis

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"Eyes don't tell people what they see… People tell EYES what to look for."

Larry MacDonald, OD

What to look for…

- As this quote by Larry MacDonald implies, top-down direction of attention can modify visual perception.
- For patients with weak binocularity, tactile input can be harnessed to support the development of stereopsis (solid-seeing).
- This presentation introduces tactile-visual integration, with specific ideas on how to apply it in the vision therapy room.

Related Article

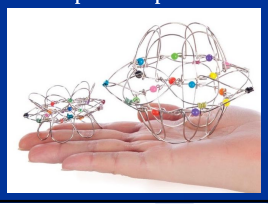
- Slotnick S. Tactile-visual integration and stereopsis. Vision Dev & Rehab 2015;1(4):272-9.
- http://pubs.covd.org/VDR/issue1-4/files/22.html

Stereo-tactile and Stereopsis Integration

- Object manipulation is one of our first forms of "solid-seeing" (stereopsis).

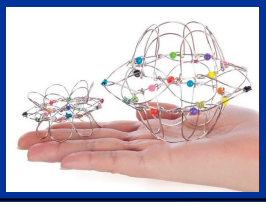
Stereo-tactile and Stereopsis Integration

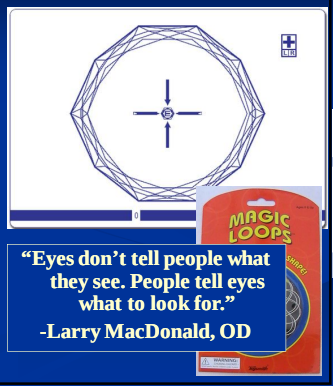
- As babies, we put objects in our mouths to learn about feel, texture, size, shape, etc.
- As we mature, we can use our palms, full of interacting sensors, to provide feedback on shape and depth.



Stereo-tactile and Stereopsis Integration

- Reshape these "Magic Loops" to match the contour of the object in the vectogram. **(Gem**, right)
- Helps to push appreciation of stereopsis while holding the solid shape in hand.





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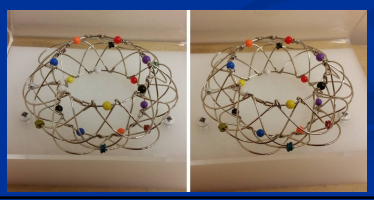
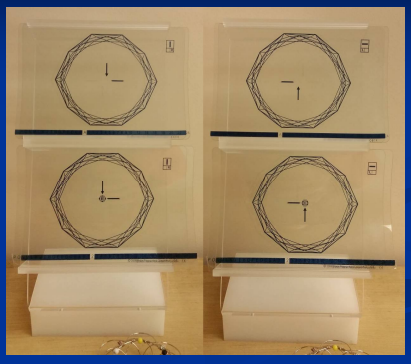
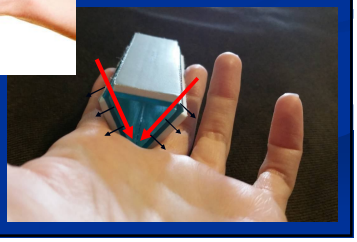




Key Points

- Cup the hands, relax the muscles
- *Receive* the object with the whole hand, not just finger tips
- Let *the object* separate the fingers, like a WEDGE.
  - The object pushes the index and third finger apart.
  - This helps the brain understand the ANGLES of the shape.
  - The brain has mapped these parts as adjacent to each other.
  - FEEL them being separated: The object takes up space.

Wedge to separate parts:



Key Points

- Feel the object with hands out-of-view.
- Look at the stereo-target.
- Actively imagine that it has the shape which you are holding in your hands.
- "Look soft." Take in the whole image.
- Don't over-attend to the center.

Key Points

- Let your peripheral vision grab the same shape, both BI and BO, sequentially.
- Breathe.
- "Know what to look for."
- Allow yourself to see it in both places:
  - Above/below; farther/closer.
- Observe that the Fixation Disparity lines come to alignment without effort.

"Helen Keller Seeing"

- Consider the use of tactile demonstrations as a "Helen Keller" method, which greatly supports patients with strabismus and/or compromised binocularity.
  - Such patients have come to trust spatial input from the **hands** more than their *visual* input.
  - By coordinating the two data streams (tactile and visual), these patients can train themselves on what to look for…
  - …and in the future, may come to recognize the organized visual input *without* the tactile intermediary.

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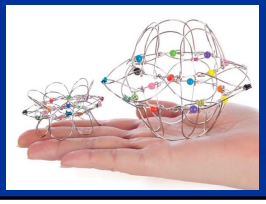

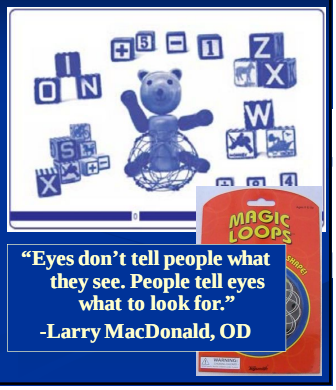

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Visual-Auditory Integration

- Sound localization can be a powerful mode of spatial processing.
- Instead of localizing floating aspects of a vectogram image with one pointer, TRY USING TWO!

- Localize with one pointer, and then tap on it with a 2nd pointer.
- Provides tactile/ vibrational stimulation *along with* **auditory localization**!
- Also helps with egocentric localization using arm extension.

In Summary…

- The brain organizes space, taking contributions from *all* sensory modalities.
- By providing input to multiple senses in parallel, therapists can catalyze the "a-ha moments" of experiential learning.

Questions? ☺

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