

A Novel Contribution to the Optometric Rehabilitation of Amblyopia

ICBO 2010

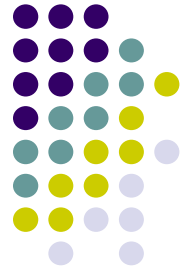
Deborah Zelinsky, O.D.

The Mind-Eye Connection

Northbrook, IL USA

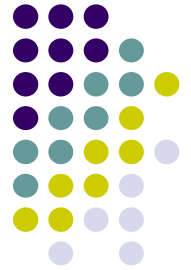
www.mindeyeconnection.com

Goals



- To define ambient visual processing
- To discuss the importance and extent of ambient visual processing
- To distinguish the difference between ambient visual processing and peripheral visual processing
- To demonstrate how treatment of ambient visual processing affects focal processing in relation to amblyopia

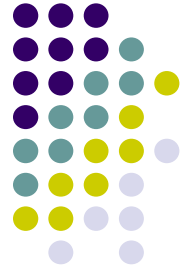
Objectives



To be able to:

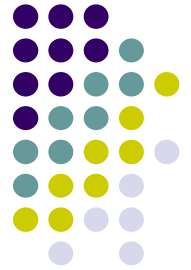
- understand what ambient visual processing encompasses
- recognize how ambient visual processing interacts with focal processing
- appreciate the full scope of care that optometry represents

Case Information

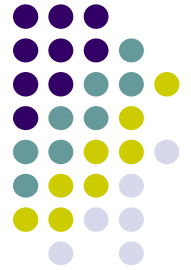


- 4.5 year old WL went to an ophthalmologist for a mandatory eye evaluation before kindergarten where they discovered a lazy eye.
- He came to the Mind-Eye Connection for a 2nd opinion on treatment options.
- EYESIGHT
 - Distance
 - R 20/50 struggling
 - L 20/20 effortlessly
 - Near
 - R 20/30 with difficulty
 - L 20/20 effortlessly
- RETINOSCOPY (gross findings)
 - Distance R +3.25 Near R +2.75
 - L +2.75 L +1.75
- REFRACTION
 - R +1.50 sphere 20/40 BVA (Pinhole No Improvement)
 - L +0.75 sphere 20/20

Habitual eye position and range of tolerance



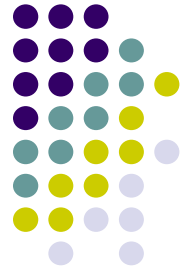
- Habitual extraocular muscle position
 - Distance: 2 exophoria
 - Nearpoint: 6 exophoria
 - Vertical: orthophoria
- Habitual intraocular muscle position
 - Accommodative Lag R +3.75
 - L +1.75
 - Pupils: 4 mm
- Ranges of tolerance
 - Aiming:
 - Distance
 - Suppressed (non-amblyopic) left
 - Nearpoint
 - BO x/24/18
 - BI x/18/6
- Focusing on a 20/50 target at 14 inches
 - R +2.25 to +1.50
 - L +3.00 to -4.00
 - Both +3.00 to +0.50 with difficulty



Testing methods

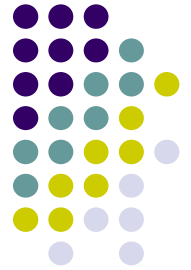
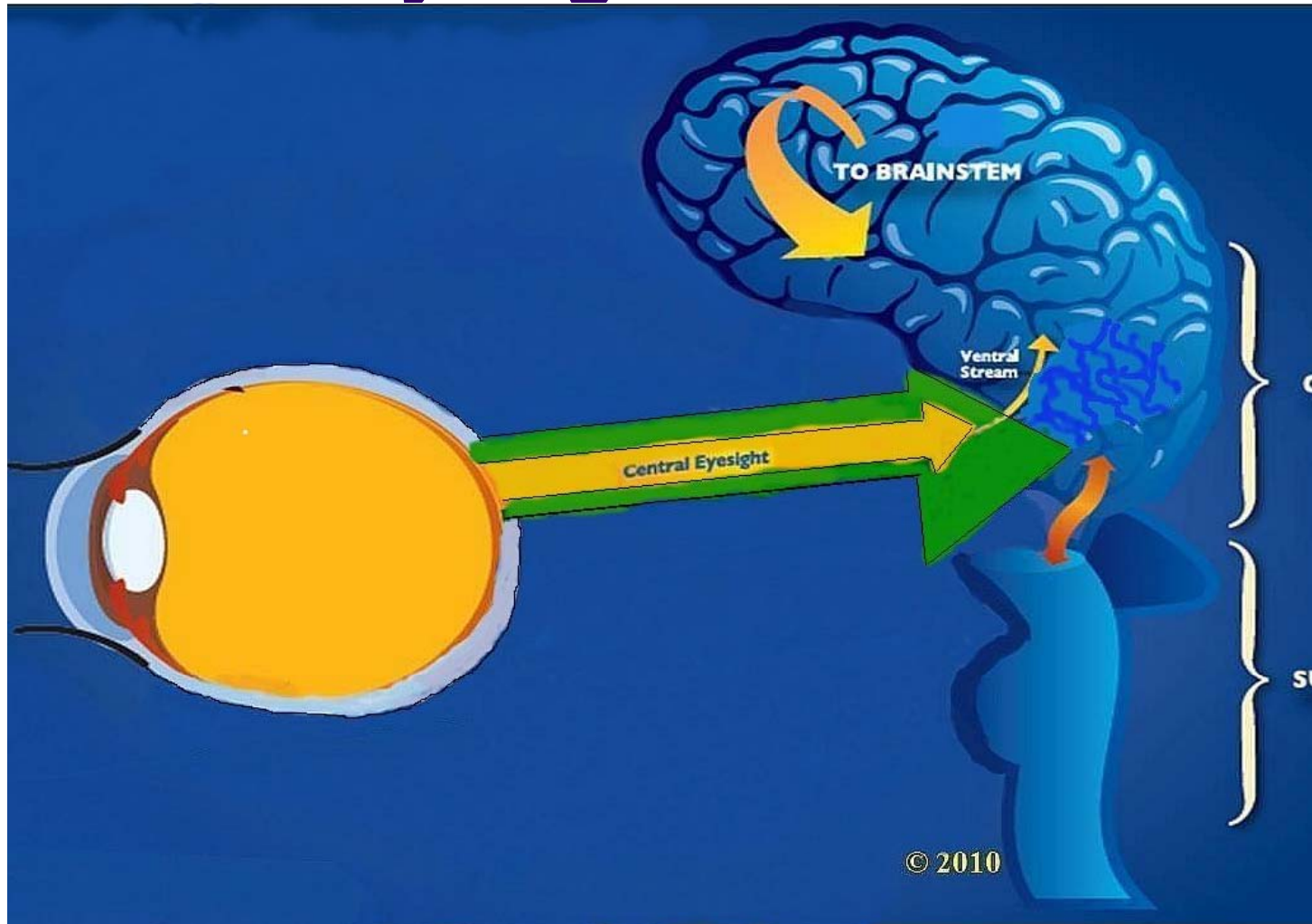
- Patient stationary, target stationary
 - Unable to accurately localize sounds on Z-Bell testing
 - Stereopsis was achievable, but with significant effort
- Patient stationary, target moving
 - Padula visual midline test accurate horizontal and vertical
 - Following target and thinking
- Patient moving, target stationary
 - Spatial Orientation was poor.
 - Residual asymmetric tonic neck reflex present
 - Standing on L foot, arms out to balance; on R foot very wobbly
 - Couldn't hop on his right foot
 - Dominant (right) hand and arm held tightly to his side when trying to skip
- Patient moving, target moving
 - Patient can't catch ball easily

Additional History & Findings

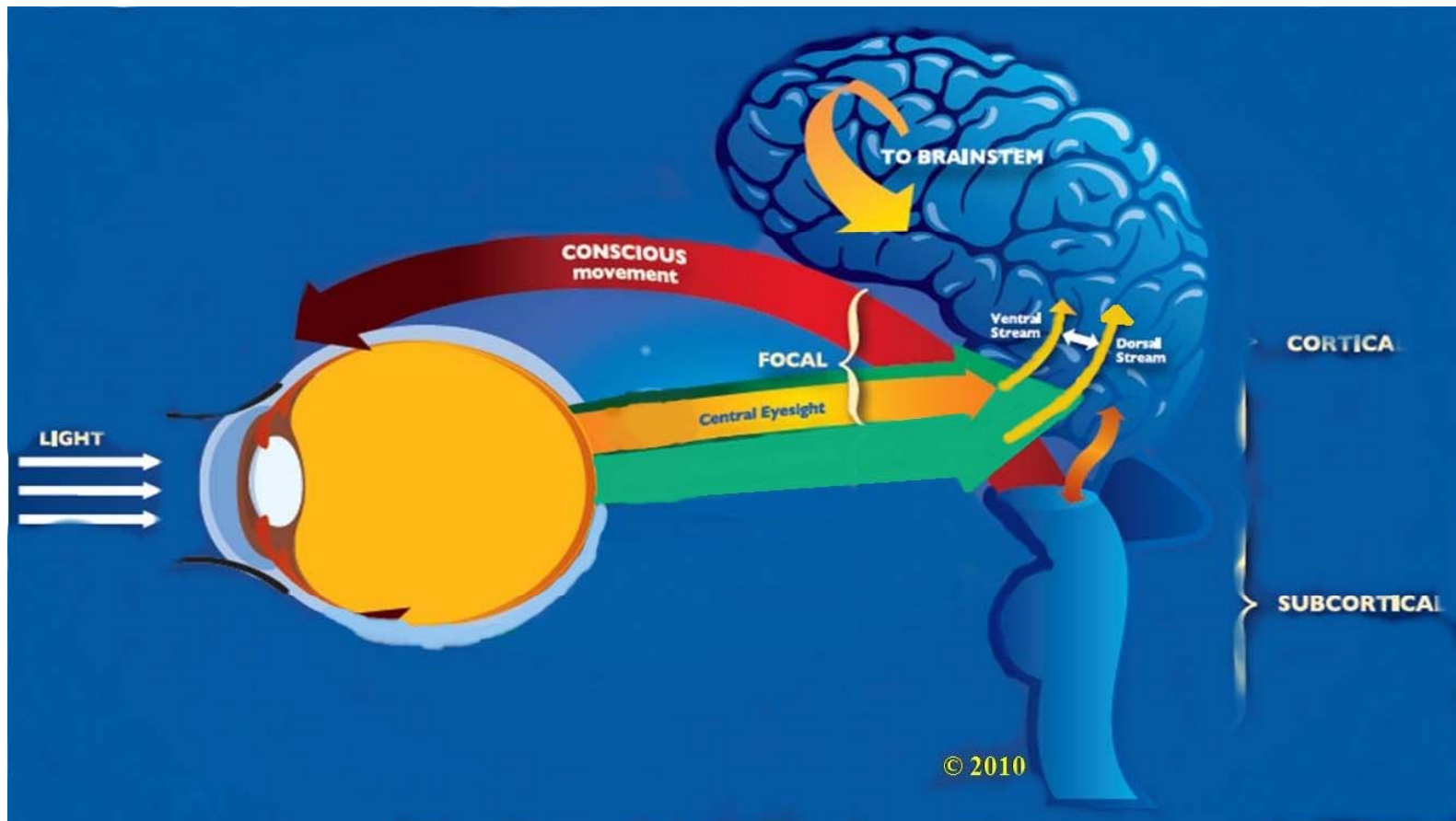
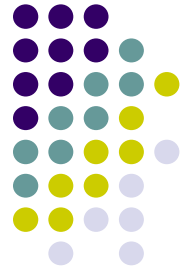


- Normal
 - eye health
 - full range of motion of extraocular muscles,
 - smooth pursuits
 - confrontation field,
 - color vision
 - tactile pressure
- Currently on Zyrtec
- Kidney reflux during first year of life
- Tubes in ears during second year of life
- Broken right collarbone (in sling for 8 weeks) at age 3 and a half

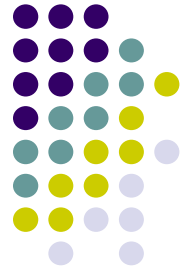
Central eyesight



Central Eyesight and Intentional Movement

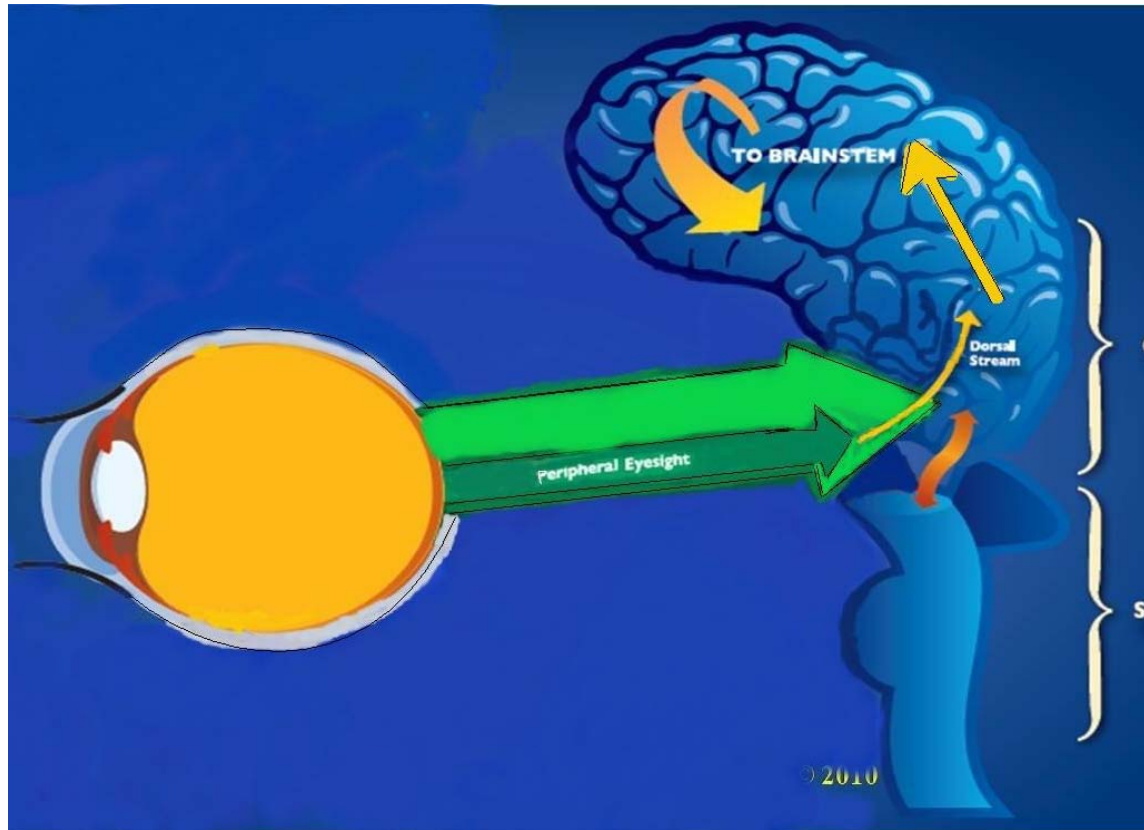
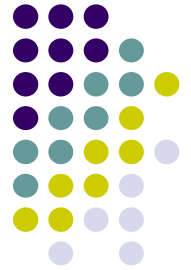


WL's Eyesight & Focal Visual Processing

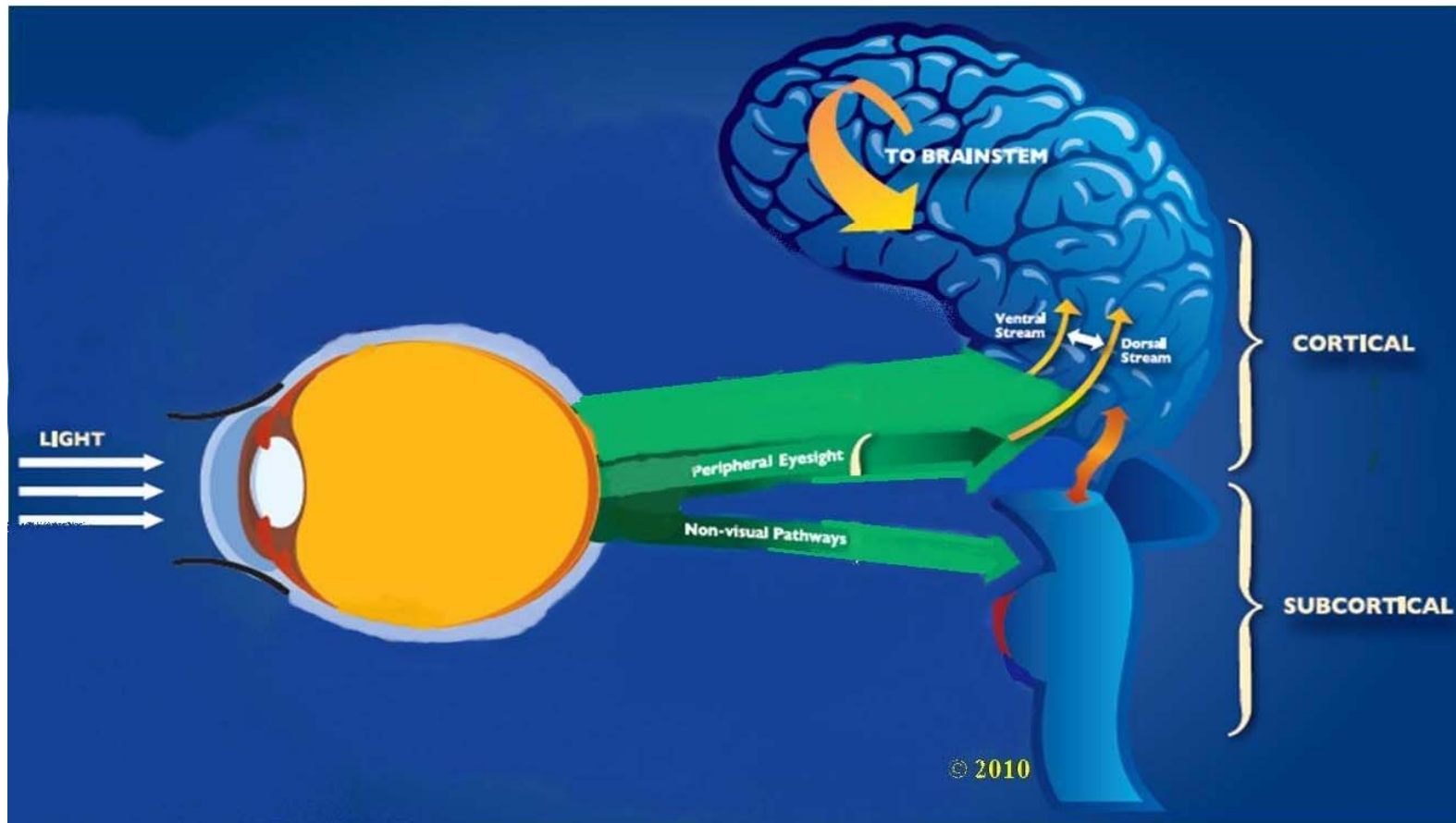
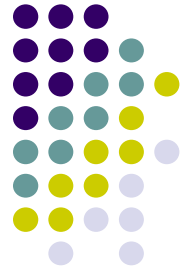


- Central eyesight in WL was not balanced.
- Accommodation was sluggish
- His broken collarbone restricted his arm movement and probably his eye movement
- Intentional control of large muscles was difficult, so at this stage, lenses (for central eyesight) would not be first choice.

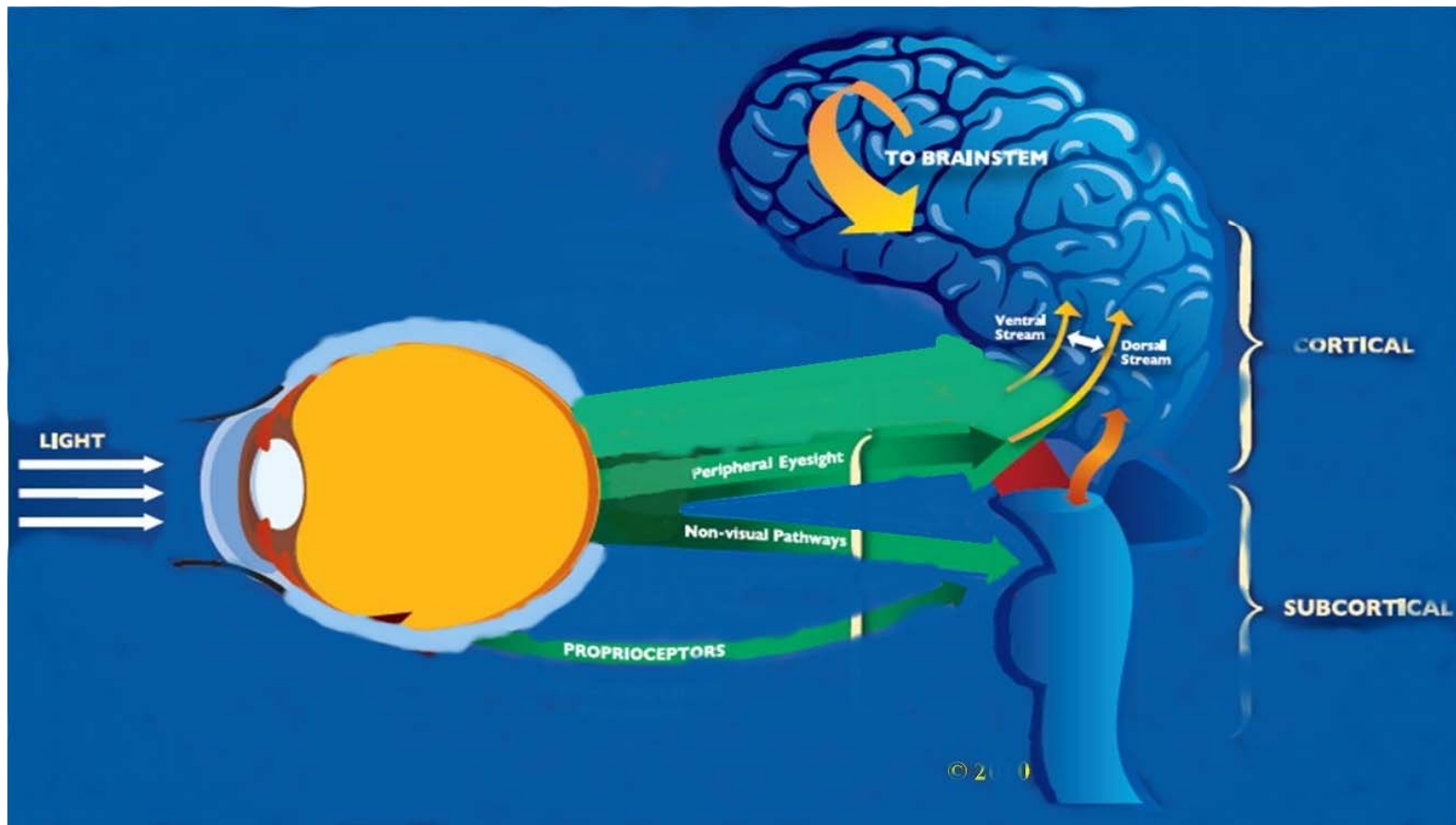
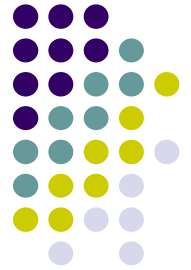
Peripheral Visual Processing



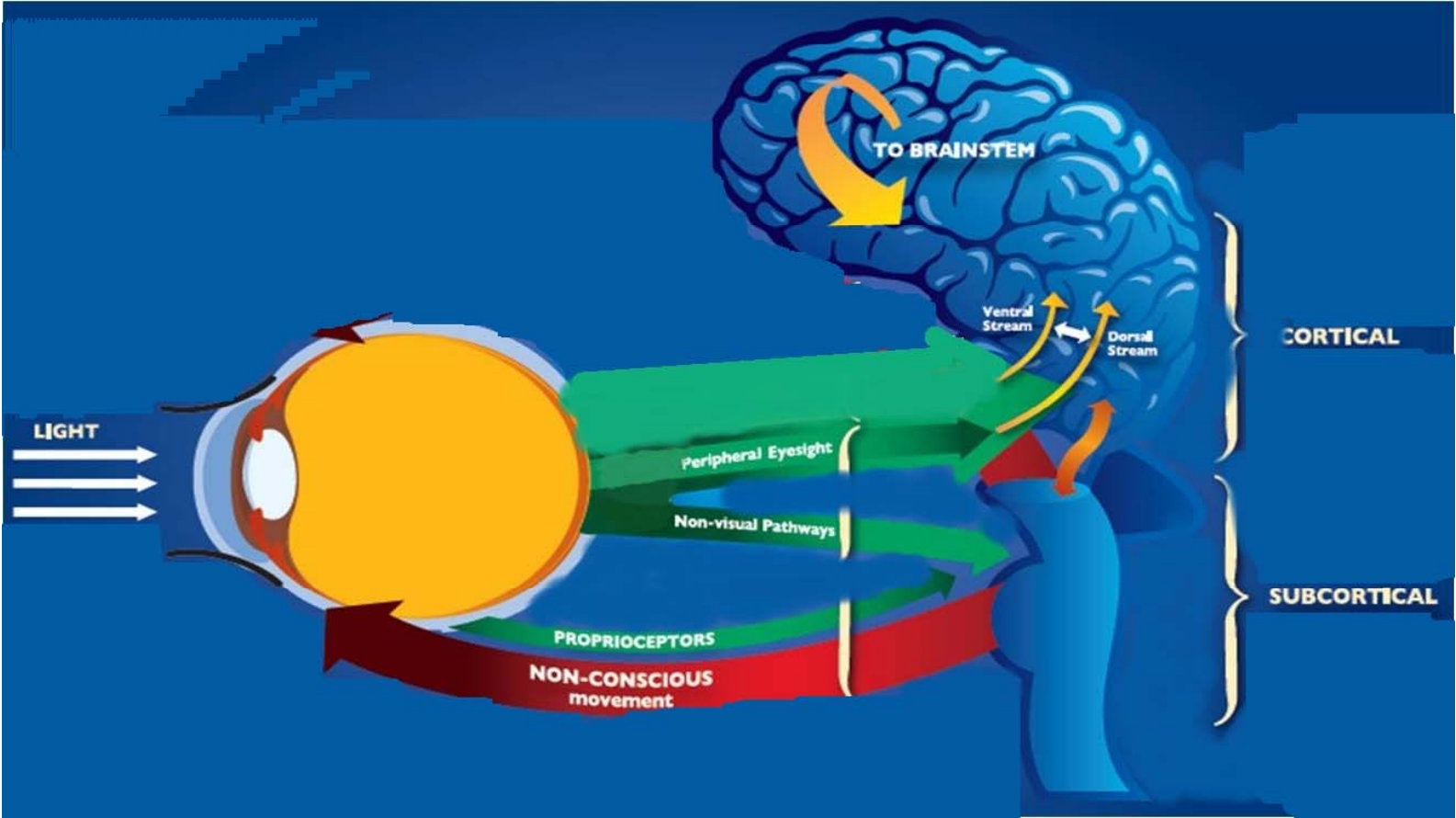
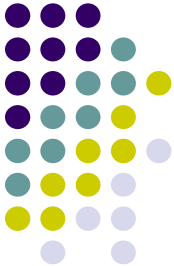
Non- visual pathways



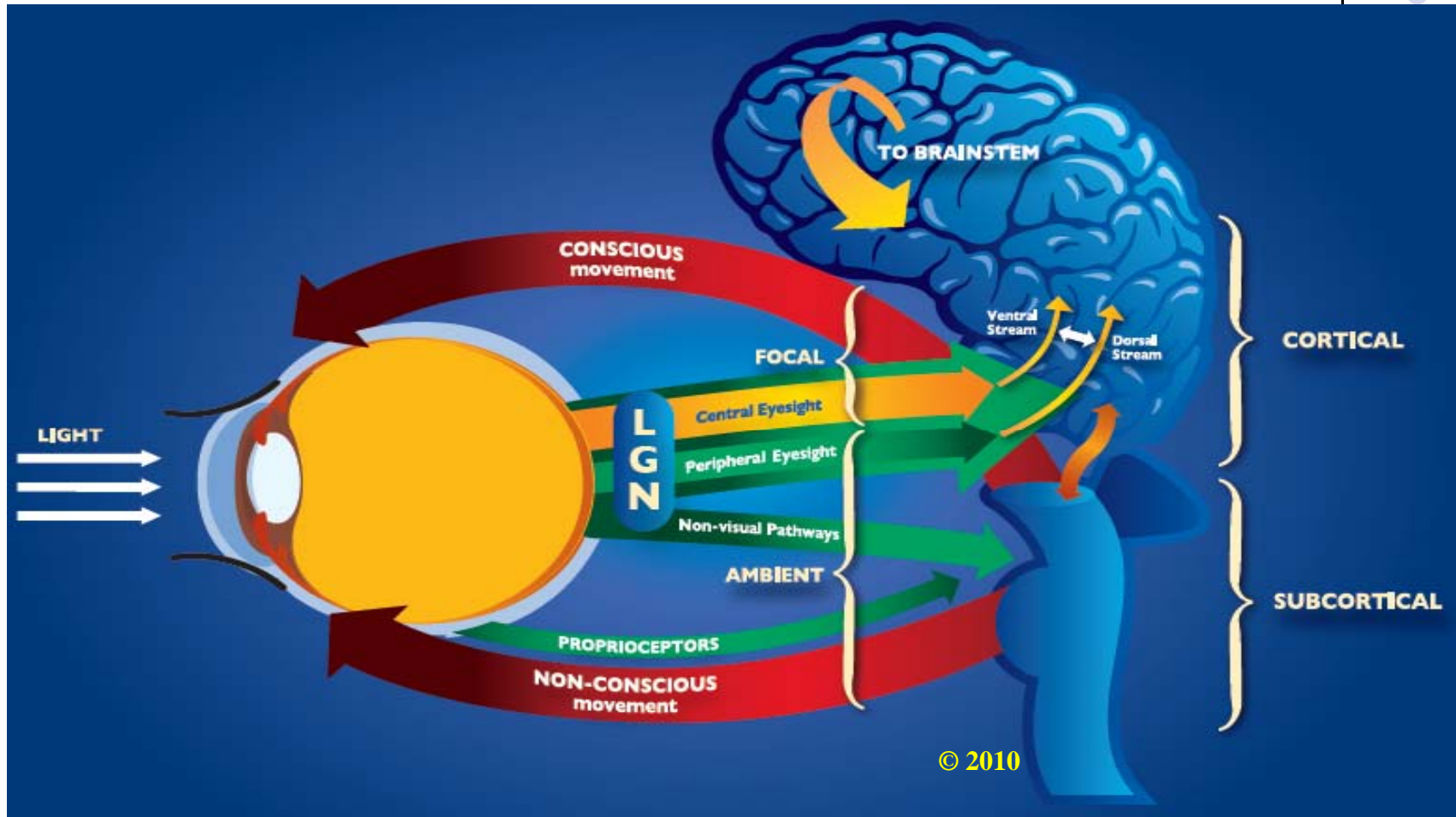
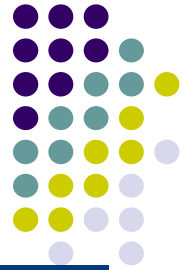
Proprioceptors



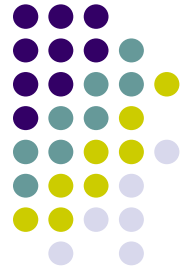
ambient visual processing



More than eyesight

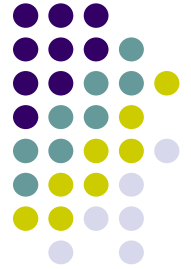


WL's treatment options



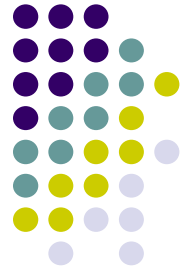
- **TREATING SYMPTOMS**
 - Lens for eyesight.
 - Patching for eyesight development
- **DEVELOPMENT OF conscious movement**
 - Intentional eye movement activities to develop eye motor control, first monocularly, then binocularly
 - Stimulation of gross motor control
- **NON-Conscious ambient visual processing**
 - Passive alteration of visual environment to non-consciously modify habitual peripheral visual processing

WL's choice



- Treatment chosen working with the non-conscious ambient processing rather than the conscious focal

WL's initial treatment plan



- Shoulder stimulation games and
- Passive peripheral eyesight stimulation
- ATNR activity
- Ball bouncing
- Wheelbarrow moving head
- Arm and shoulder activity
- Follow up in 3 weeks

WL's progress



Measurements

Visit 2 February, 2009

- +1.00 sphere OU with 20/25 R
- Perceives SILO at near
- Stands better on R foot

Visit 3 April, 2009

- +0.50 sphere 20/20--
- +0.75 sphere
- Saccadic fixations 48/33

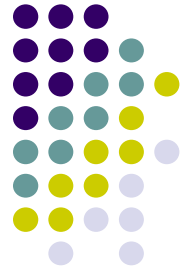
Visit 4 July, 2009

- Plano sphere 20/20 strained
- Plano sphere 20/20 easily
- Saccadic fixations 29/27
- Lag +1.25 Right eye
- Accom range +2.50 to -3.00

Recommendations

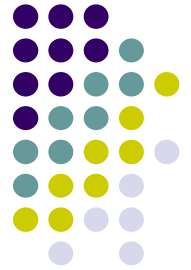
- +0.62 sphere eyeglasses were prescribed 4 hours per day
- Patch left eye with 0.4 Bangeter filter 20 minutes per day.
- Continue working with hopping. Standing was excellent, as was ATNR recipient
- Discontinue glasses and patch

Conclusion



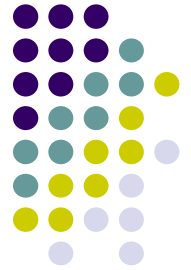
- Many amblyopes need visual therapy to regain functional usage of central eyesight used in focal processing
- But, in WL's case, focal visual processing was indirectly addressed by remediating ambient visual processing:
 - developing bilaterality with shoulder and hopping activities
 - structured changes in his environment

Did we achieve the intended goals?



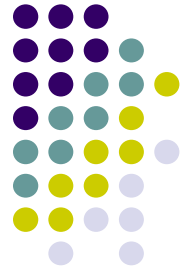
- defined ambient visual processing
- discussed the importance and extent of ambient visual processing
- distinguished the difference between ambient visual processing and peripheral visual processing
- demonstrated how treatment of ambient visual processing affects focal processing in relation to amblyopia

Were the objectives met?



- Are you able to:
 - understand what ambient visual processing encompasses
 - recognize how ambient visual processing relates to focal processing
 - appreciate the full scope of care that optometry represents

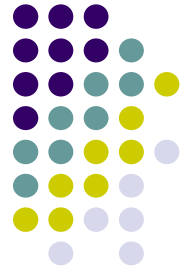
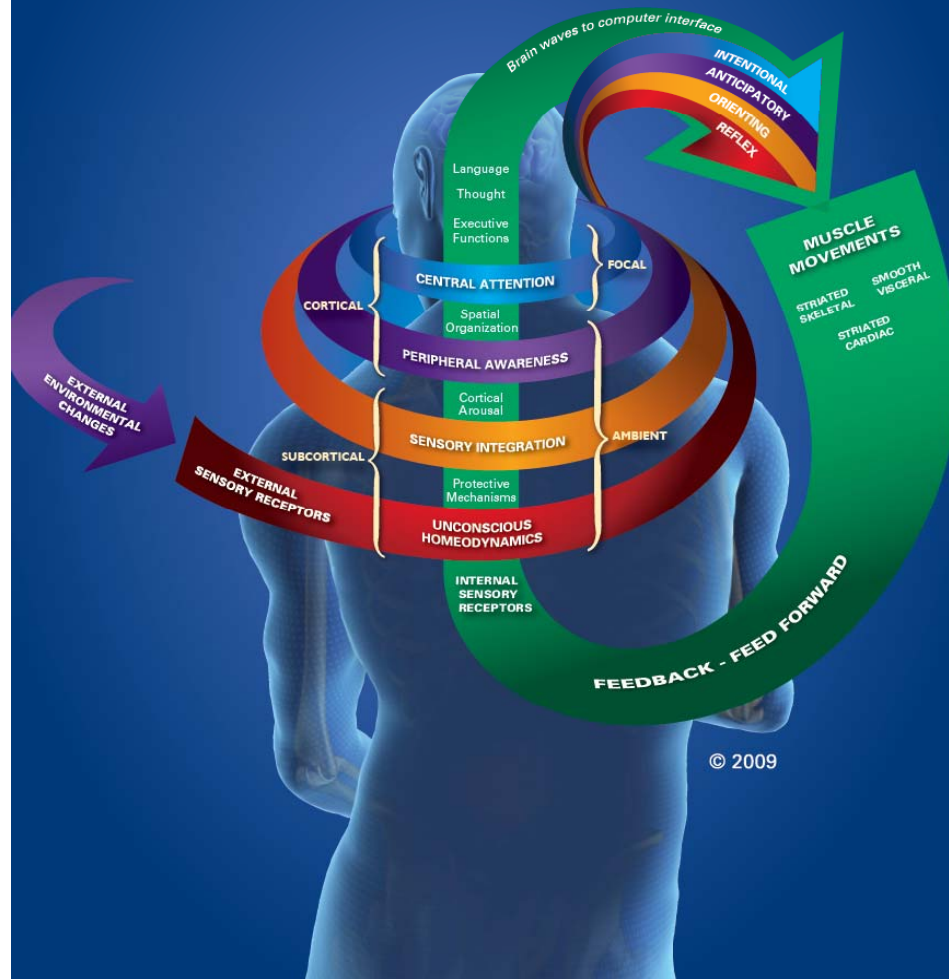
Take home points

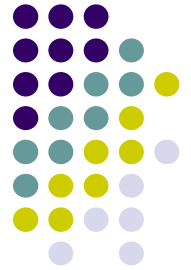


- Ambient visual processing continues to make optometrists unique practitioners because we can evaluate much more than central and peripheral eyesight.
- As of 1996, visual processing has been documented in over 300 visual pathways involving 47 cortical areas. The continual discovery of new retinal connections and retinal cell types allows for optometry to evolve.
- One way that we, as optometrists can alter focal processing is by stabilizing non-conscious ambient visual processing with our tools (i.e. lenses, prisms, filters, activities, etc)

THE DYNAMICS OF PROCESSING

(REACTIONS & RESPONSES)





Time for Questions and Thank You