

From the Hospital to Home: Using Early Visual Functioning to Support Families

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Learning Objectives

- Learners will improve their knowledge of early visual development.
- Learners will recognize educational efforts to improve relationships with hospital NICUs to conduct early visual screenings.
- Learners will be updated on the NAVEG study results to change standard of care in Neonatal Intensive Care Units
- Learners will become aware of how program interventions are applied to address neurological visual impairment needs during home visits and parent-to-parent group activities.

Anchor Center for Blind Children

- Mission
- Programs
- Eye Clinic





Early Visual Development

What Have We Learned?

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Human Brain Development



Source: Nelson, C. (2000). From *Neurons to Neighborhoods: The Science of Early Childhood Development*. Washington, DC: The National Academies Press.

The Importance of Infant State Behaviors

- Quiet Sleep (Non-REM)
 - No Body activity
 - Generally unresponsive
 - Occasional Startles
- Active Sleep (REM)
 - More body activity
 - Eye movement and may smile
 - Irregular Respirations
- Drowsy
 - Eyes glazed
 - Delayed responsiveness
- Quiet Alert
 - **Eyes wide and bright**
 - **Little Body Movement**
 - **Attentive**
- Active Alert
 - Fussiness
- Crying
 - Variable Sensitivity to stimuli

Neonatal Assessment Vision European Grid (NAVEG)



Influential Factors:

- Valid
- Components of Visual Screening
- Not invasive
- Easy to train

The History of the NAVEG

Greater understanding of visual development

Study: 2011- 2014: Department of neonatology and NICU in Brescia, Italy

Sample Included:

- 80 infants born at or below 34 weeks
- 80 infants born at 40 weeks
- Sufficiently sensitive to identify neurological risk
- Goal is to identify infants who need early intervention





Working with the NICU

What Have We Learned?

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Educational Efforts for Project Success

- Work with your local pediatric ophthalmologist
- Connect with your NICU staff and collaborate
- Learn as much as you can about your NICU's philosophy and scheduling
- Know that physical states of the babies are critical for success
- You may have to do the NAVEG more than once

The Current NAVEG Study

Infants identified through **ROP lists at 31 7/8 weeks**

Two weeks to obtain parental informed consent

Approved to include **100 infants**

Each Item has a score of

- **0** - healthy child response
- **1** - incomplete response
- **2** - atypical response

Total score of **6** and over indicates **significant neurological risk of visual impairment**

Follow up calls at one year to determine visual status.

Case Studies

Felicity

- Diagnosis of Hydrocephalus
- No shunt at this time
- (3 months) Initial NAVEG screening: **10**
- (9 months) NAVEG screening: **6**
- Receives Home Visits

Tyodus

- Diagnosis of Hemimegalencephaly
- Left Hemispherectomy for seizure control (shunt placed)
- (6 months) Initial NAVEG screening: **15**
- (12 months) NAVEG screening: **4**
- CVI Range: 6/7
- Receives Home Visits

The NAVEG Screening

- Sections:
 - Ocular Visual Components
 - Motor Visual Components
 - Perceptual Visual Components

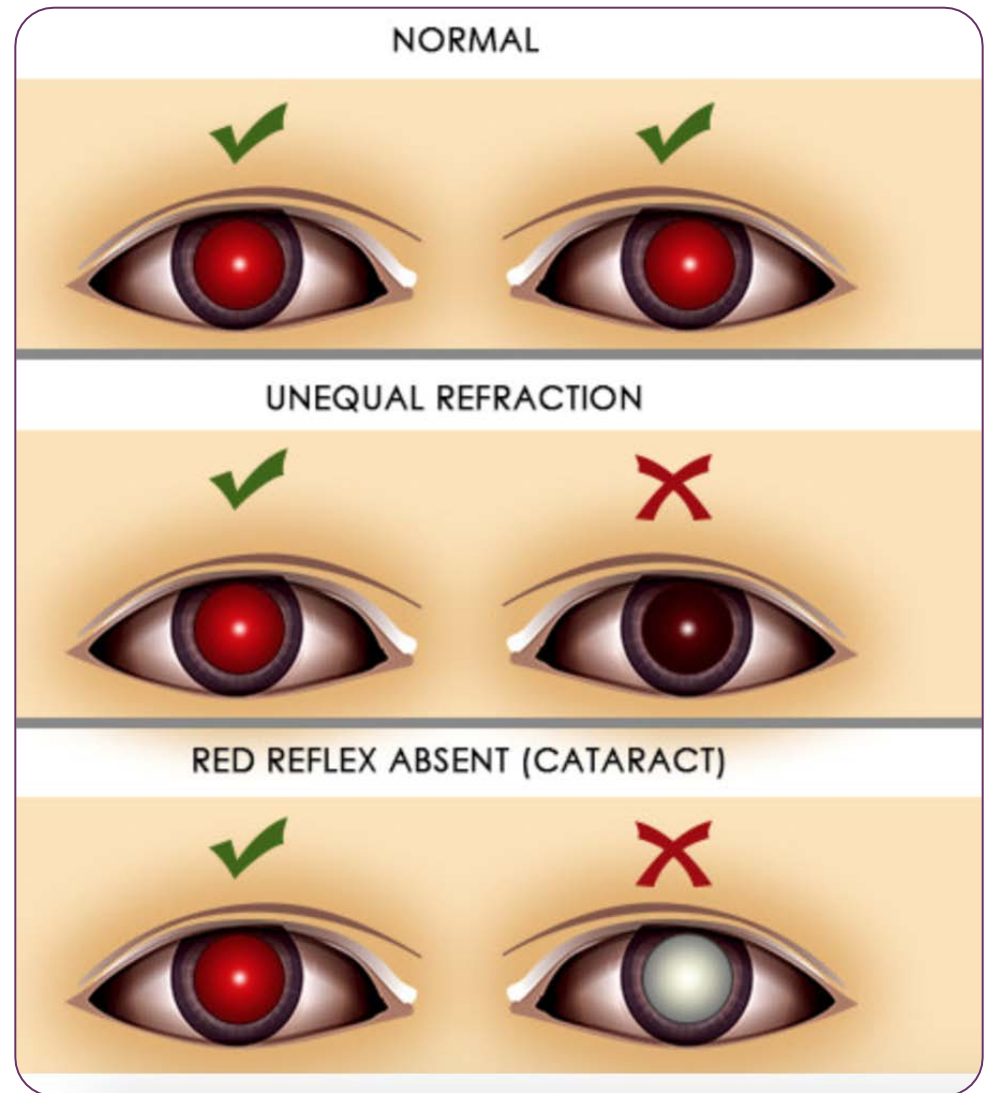


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Ocular Visual Component

- Pupillary Light Reflex
- Red Reflex
- Eye Abnormalities
- Fundus Abnormalities

Pupillary Reflex and Red Reflex



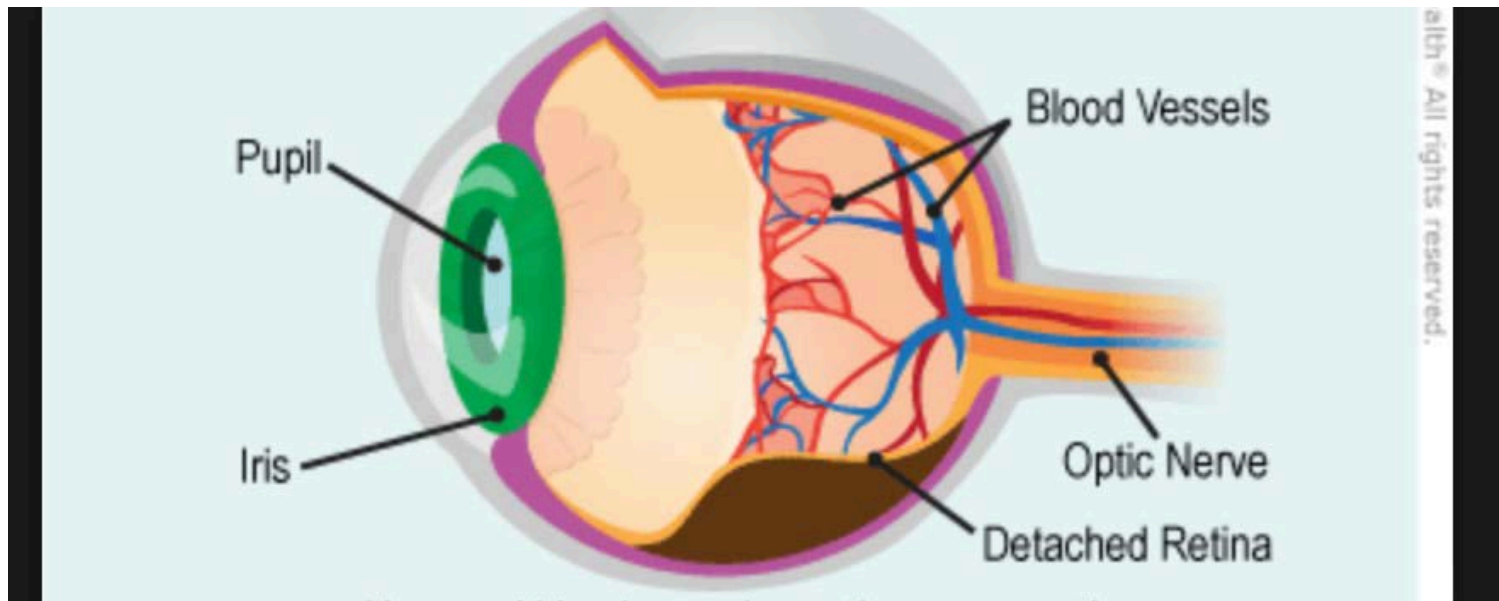
Eye Abnormalities

- Colobomas
- Microphthalmia
- Ptosis
- Aniridia



Fundus

Abnormalities: Retinopathy of Prematurity



Motor Visual Component

- Fixation
- Smooth Pursuit
- Saccadic Movements
- Sunsetting
- Nystagmus
- Paroxysmal Deviation
- Strabismus

Observational

- Sunsetting
- Nystagmus
- Strabismus
- Paroxysmal deviation



Fixation, Pursuit, and Saccades



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Central Fixation

- *Please refer to webinar recording for this video*

Saccades

- *Please refer to webinar recording for this video*

Perceptual Visual Component

- Contrast Sensitivity
- Visual Acuity
- Visual Fields
- Optokinetic Nystagmus

Contrast Sensitivity

1. Use Blank, 100%, and 25% cards
2. Present at 1 foot, separate at Midline
3. If No response, adjust distance

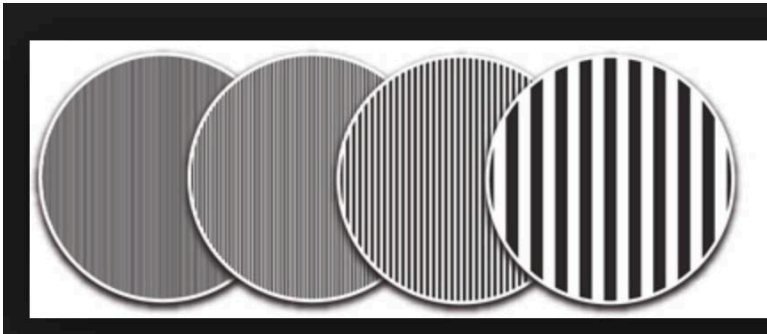


Contrast Sensitivity

- *Please refer to webinar recording for this video*

Visual Acuity

Leah Gratings



Teller Acuity



Visual Acuity

- *Please refer to webinar recording for this video*

Visual Fields

- *Please refer to webinar recording for this video*

Optokinetic Nystagmus

- The optokinetic reflex is an involuntary eye movement (nystagmus) that stabilizes retinal images in the presence of relative motion between an observer and the environment.

This does not play any longer.
Link to youtube is:

<https://youtu.be/g7MjBQhV-tg>



OKN Response

- *Please refer to webinar recording for this video*

Reflexes

■ *Please refer to webinar recording for this video*

- Response to Touch
- Response to Threat
 - Peripheral and central visual pathways intact
 - Confirms cortical vision

NAVEG Updates

- What Do We Know?



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What Do we Know?

- Babies are **capable!**
- NAVEG does **identify infants** with neurological risk (CVI?)
- Early brain plasticity can **rewire** visual pathways
- We can help parents to improve the use of **functional vision**

Next Steps for Families



- Referral to Early Intervention
- Functional Vision Assessment
- CVI Range
- Individualized Programming
- Routines- based CVI characteristic intervention

Program Interventions: Best Practices at Anchor Center

Intervention Group

- Assessments: NAVEG, CVI Range, PICCOLO, Child/Caregiver Strategy Use
- Family-Centered Interventions for Daily Routines- Strategy sheets
- Bloomz App/ weekly reminder texts
- Family Advocacy Meetings

Control Group

- Assessments: NAVEG, CVI Range, PICCOLO, Child/Caregiver Strategy Use
- Business as usual Early Intervention

What's Next?

- Complete NAVEG cohort at Rocky Mountain Hospital for Children
- Collaborate in NICU follow-up clinics
- Test family-centered interventions supported by research
- Establish protocol for Birth to three population
- Establish Protocol for preschool population

Thank You! Questions?

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