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?
Human Brain Development

- Sensory pathways (vision, hearing)
- Language
- Higher cognitive function

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

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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

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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

**Tydus**
- 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

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Eye Abnormalities

- Colobomas
- Microphthalmia
- Ptosis
- Aniridia

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Fundus Abnormalities: Retinopathy of Prematurity
Motor Visual Component

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

- Sunsetting
- Nystagmus
- Strabismus
- Paroxysmal deviation

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Fixation, Pursuit, and Saccades
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

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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

- Response to Touch

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

Please refer to webinar recording for this video
NAVEG Updates

- What Do We Know?
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

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# Program Interventions: Best Practices at Anchor Center

<table>
<thead>
<tr>
<th>Intervention Group</th>
<th>Control Group</th>
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</thead>
<tbody>
<tr>
<td>- Family-Centered Interventions for Daily Routines- Strategy sheets</td>
<td>- Business as usual Early Intervention</td>
</tr>
<tr>
<td>- Bloomz App/ weekly reminder texts</td>
<td></td>
</tr>
<tr>
<td>- Family Advocacy Meetings</td>
<td></td>
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</tbody>
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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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