



VISUAL ACUITY EXAMINATION IN INFANTS

جامعة ساوة

كلية التقنيات الصحية والطبية

قسم تقنيات البصريات

المرحلة الرابعة

الفصل الأول

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General considerations

- ❑ Infant visual acuity (VA) testing is **hard** as they are **non-verbal**
- ❑ VA in infants measures **resolution** acuity, **not recognition** acuity
- ❑ **Quantitative** assessment is crucial for finding **amblyopia** early
- ❑ **Qualitative** checks give **vital** information.

An infant is: a child from **birth** up to **one year** of age.



i. Quantitative VA tests in infants

VIA

GRATING ACUITY



- ❑ A grating is alternating black/white stripes
- ❑ Grating acuity is standard for preverbal VA
- ❑ It measures resolution acuity
- ❑ Infants prefer patterns, which is the basis for this test
- ❑ The finest stripes an infant sees is their acuity threshold
- ❑ Grating acuity slightly overestimates true recognition acuity.

I. FORCED-CHOICE PREFERENTIAL LOOKING (FPL) (BEHAVIORAL TEST)



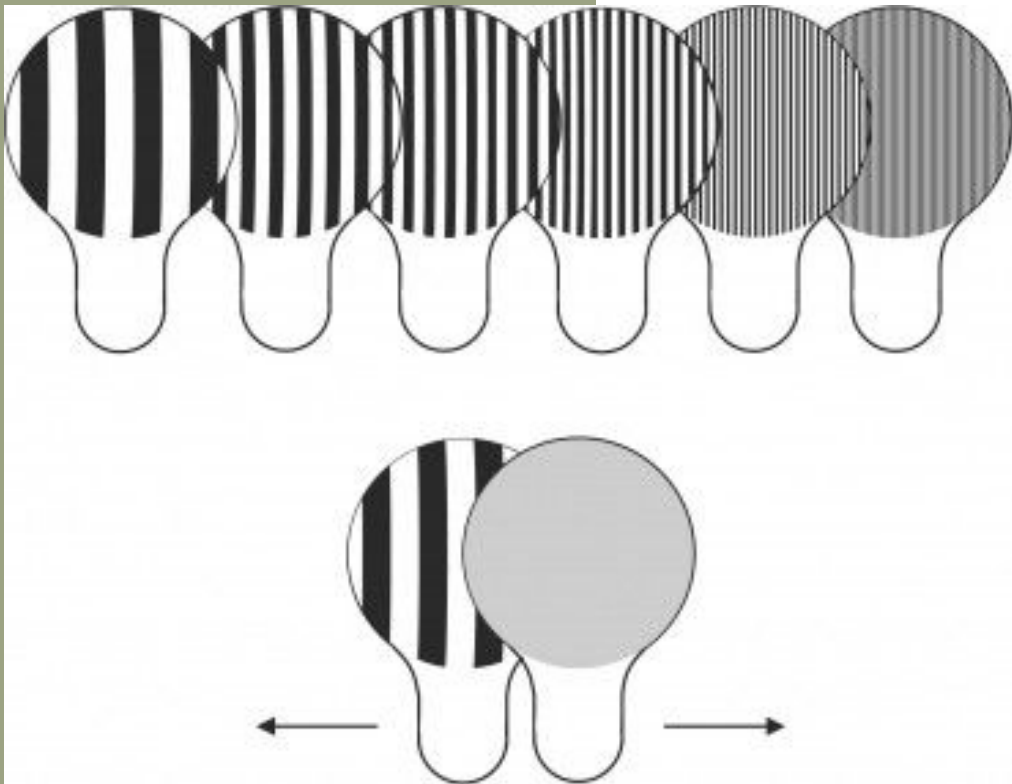
- ❑ FPL is the **main quantitative** behavioral VA test
- ❑ It uses the fact that infants **prefer patterns** over **plain gray**
- ❑ The test shows a **grating on one side**
- ❑ and **blank gray on the other**
- ❑ A **blinded observer** judges where the infant looks
- ❑ Acuity is the **point** where the observer's judgment **falls to chance**

A. TELLER ACUITY CARDS (TAC) METHOD



- ❑ It applies the FPL principle clinically
- ❑ The cards are large rectangles with a grating on one half and plain gray on the other
- ❑ The set uses cards with progressively finer stripes
- ❑ The examiner watches the infant through a peephole
- ❑ to see the gaze preference of the infant
- ❑ The finest stripes the infant can see sets the acuity threshold.
- ❑ TAC is the gold standard for infant grating acuity

B. LEA GRATING TEST



- ☐ It uses the Preferential Looking method
- ☐ It measures resolution acuity with stripes
- ☐ The examiner uses paddles/cards with fine gratings
- ☐ Infants show acuity by visually tracking the stripes
- ☐ Tracking the finest stripes sets the acuity threshold.

NOTE

LEA SYMBOLS TEST

- ❑ a Recognition Acuity test
- ❑ uses simple pictures (house, apple, etc.)
- ❑ Children must name or match the symbols
- ❑ requires verbal/cognitive skills
- ❑ used for children aged 3+ years.

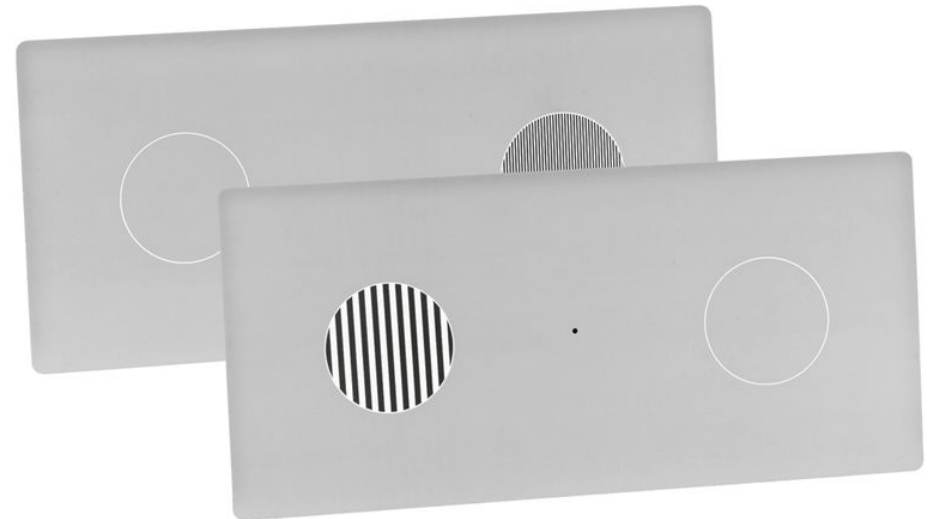


C. OPERANT PREFERENTIAL LOOKING (OPL)

- ❑ A sophisticated variation of FPL
- ❑ Its key difference lies in the introduction of a positive reinforcement (or reward) system
- ❑ as an animated toy, a short video clip, or a musical sound
- ❑ makes testing more reliable and effective
- ❑ especially for older, less compliant infants and toddlers.
- ❑ increases testing accuracy.

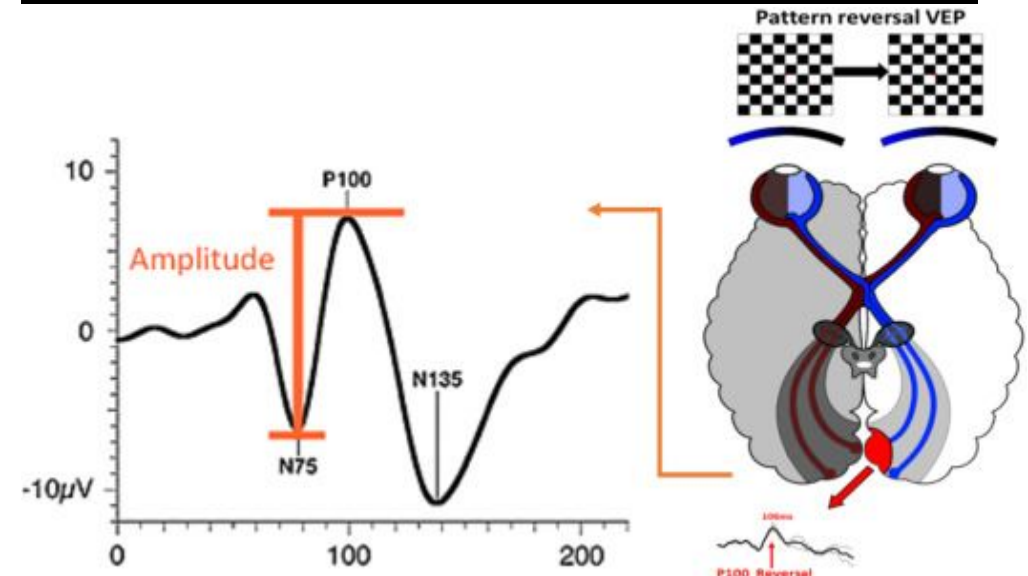
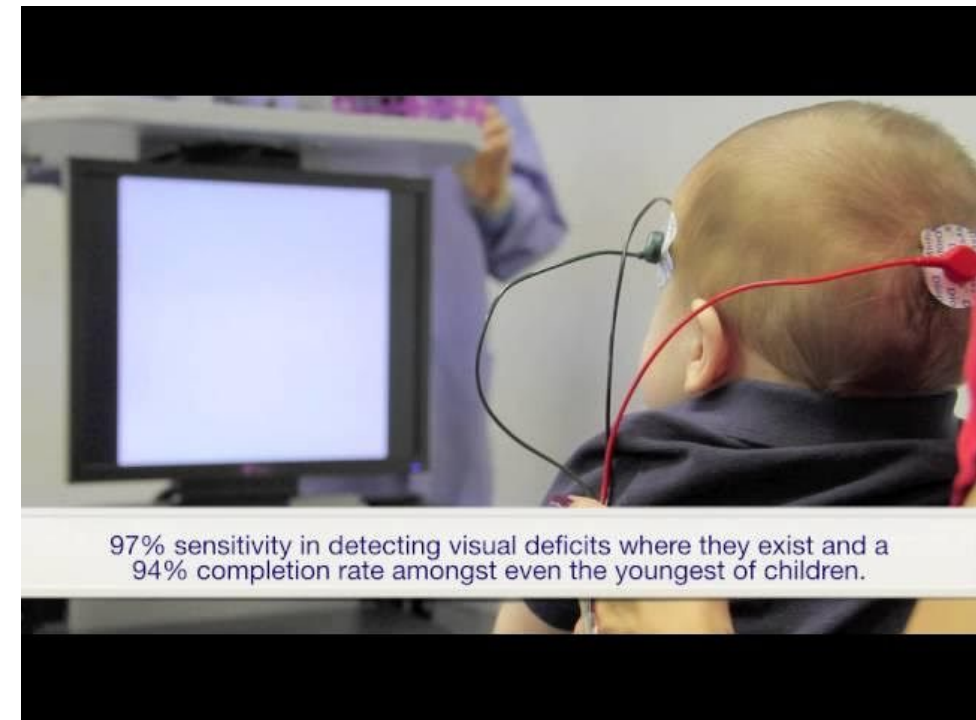
D. KEELER ACUITY CARDS (KAC)

- ❑ It uses the FPL principle
- ❑ It is functionally identical to the Teller Acuity Cards
- ❑ But it is a European adaptation and branding.



2. VISUAL EVOKED POTENTIALS (VEP)

- Visual activity sends electrical signals to the brain
- VEP uses checkerboard or grating patterns to activate the signals
- Then the scalp electrodes on the head record the brain's response
- This process appears as a diagram on the screen
- The acuity threshold is where the signal disappears
- VEP is useful when behavioral tests fail (e.g., nystagmus).



3. OPTOKINETIC NYSTAGMUS (OKN) REFLEX



- ❑ Physiological involuntary eye movement present at birth
- ❑ triggered by a moving striped drum/tape
- ❑ Catford drum test consists of black dots of various sizes instead of stripes
- ❑ Eyes show a characteristic "jerk" motion
- ❑ The finest stripes or dots that elicit OKN estimate resolution
- ❑ In Catford test, the end point is converted to Snellen's equivalent
- ❑ OKN is a subcortical reflex and less sensitive than FPL/VEP.

QUALITATIVE TESTS IN INFANTS

- ❑ a simple, qualitative visual check
- ❑ One eye is covered
- ❑ The clinician presents a visually engaging target like a toy
- ❑ The target is moved slowly and silently in front of the child
- ❑ The infant's fixation and tracking are observed
- ❑ Normal response is Central, Steady, and Maintained (CSM)
- ❑ F&F is good for finding severe gross deficits.

FIXATION AND FOLLOW (F&F)



CSM: Meaning & Significance

1. Central (C):

- Fixation is on the fovea
- the corneal light reflex is centered

- Significance: Non-centrality (eccentric) suggests eye misalignment (strabismus)

2. Steady (S):

- The eye is fixated (no nystagmus or drifting)

- Significance: Unsteady fixation suggests poor visual or neurological function.

3. maintained (M):

- Fixation is held firmly even after the other eye is uncovered
- Significance: Poor maintenance is the key sign of amblyopia (lazy eye) in the examined eye
 - if, after removing the cover
 - the infant's now-uncovered eye immediately takes up fixation
 - and the originally fixing eye drifts
 - it suggests a strong fixation preference for the newly uncovered eye.

CONSIDERATIONS

- ❑ The infant must be alert for accuracy
- ❑ Testing requires a comfortable setup at a set distance
- ❑ In all the previously mentioned tests Monocular testing is essential to find amblyopia
- ❑ Effective occlusion is needed for monocular acuity
- ❑ The observer must be blinded to the grating's position

- ❑ Infant may cry or show unsatisfaction when the good eye is covered
 - this is a key sign that may indicate amblyopia
 - This is called objection to occlusion test (O-to-O test)
- ❑ A large difference between eyes signals amblyopia.
- ❑ Results must be compared to age-normative data
- ❑ A result below the 5th percentile is concerning
- ❑ Low VA requires an eye exam for underlying causes

NORMAL VA DEVELOPMENT

- Visual function matures rapidly postnatally, especially in the first year (specifically the first 6 months)
- At birth, estimated VA is poor, 6/120 (20/400), based on detection ability.
- By 4 months, it improves to 6/60
- By 6 months to one year, VA improves to approximately 6/36 (20/120).



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